MARCH 8, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

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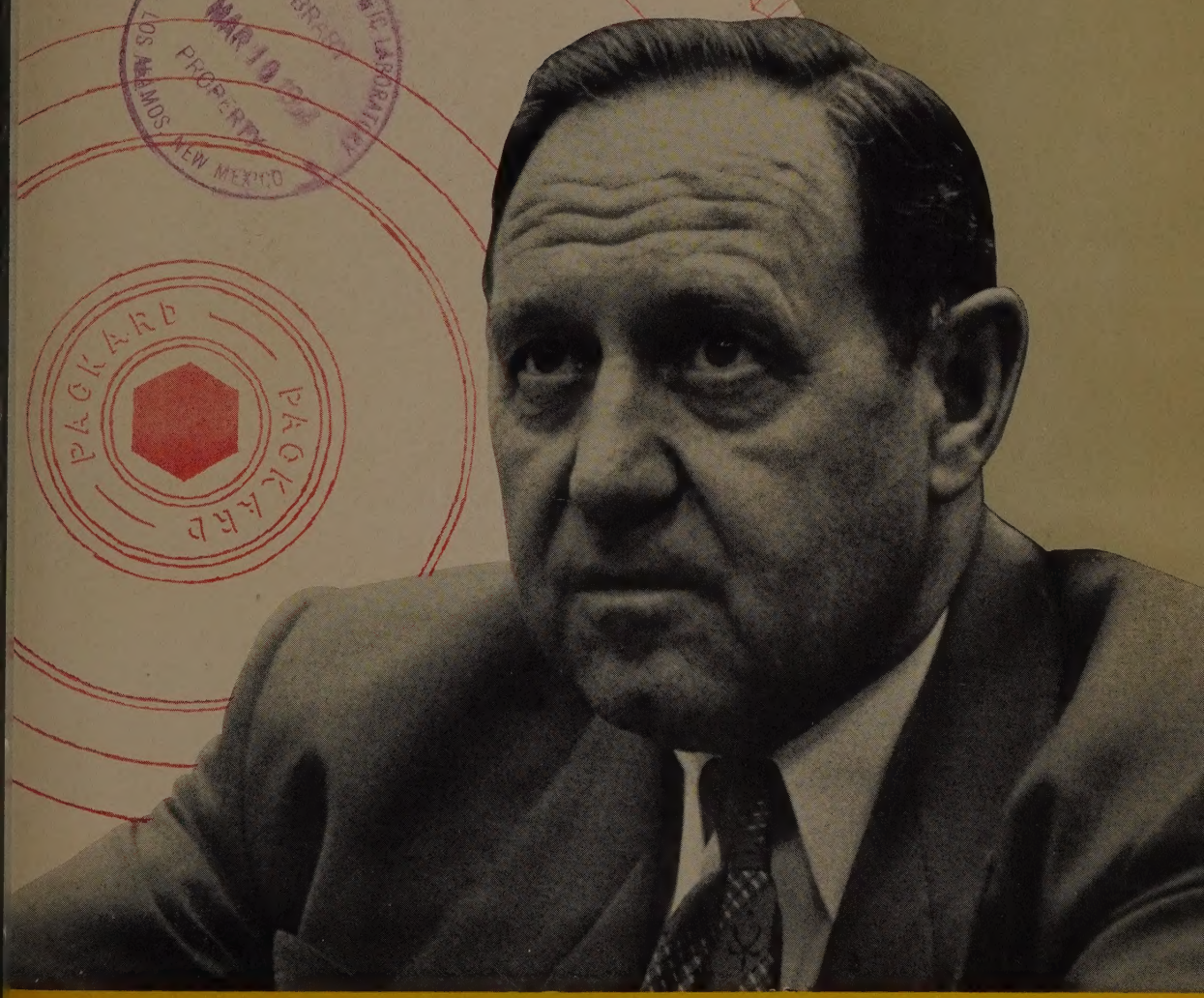

JAMES J. NANCE, *President*, Packard Motor Car Co.

ndependent Automakers Can Survive

ıe key is efficiency . . . on engines, chassis
're competitive . . . vulnerable on body tooling costs
. merger per se is not the solution"

— see *page* 87

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let us take a closer look at your

"difficult to solve" Problems Involving Tubing and Solids of Special Alloys and Cross Sections

Two years of experimental production and several thousand tons of finished extruded products have given B&W a background that can be put to work for you in solving problems involving tubing and solids of special alloys and cross-sections. Through extrusion at B&W:

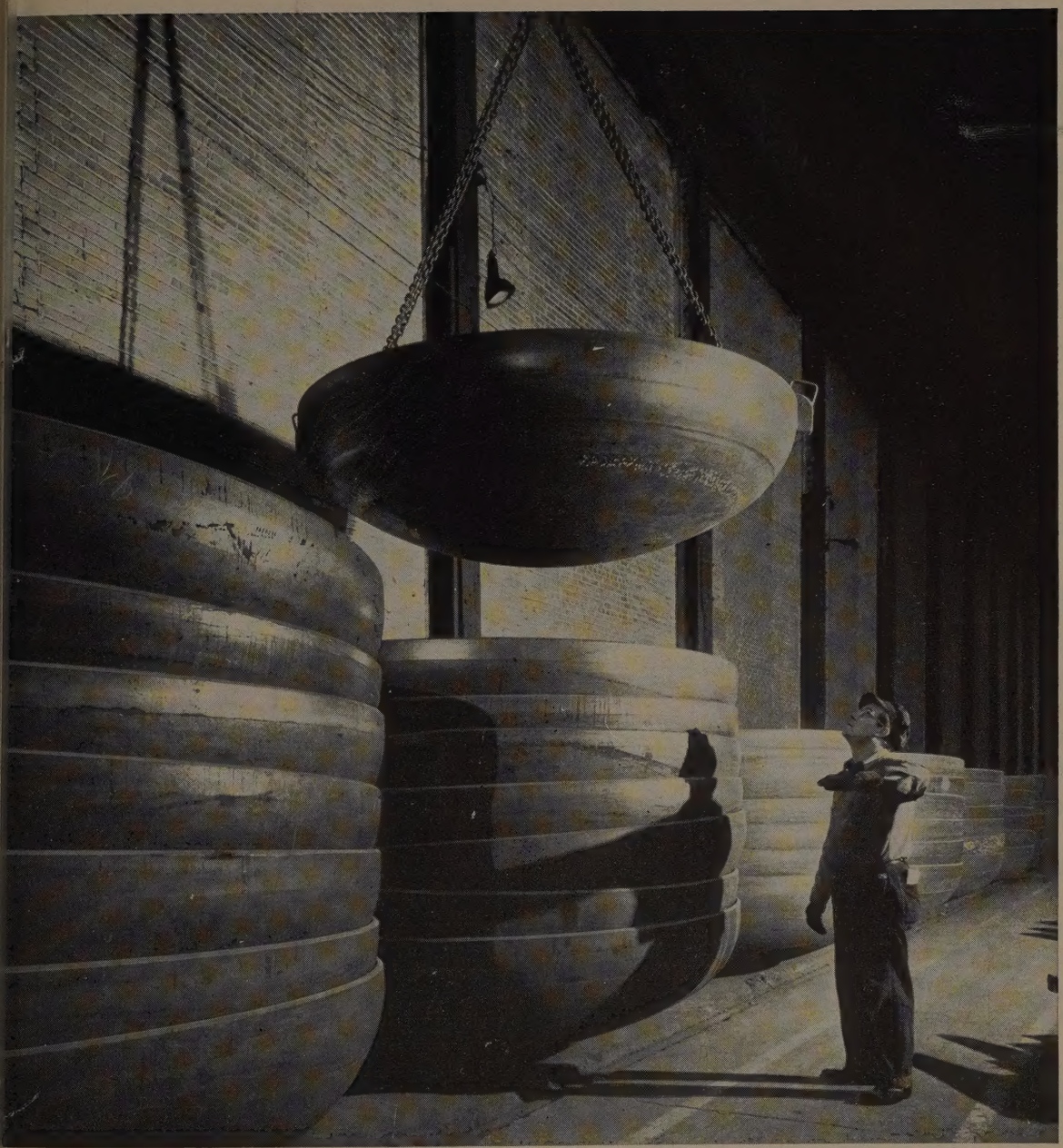
1. *New alloys have become commercially available as seamless tubing.* These include certain proprietary alloys and various types of ferrous alloys which have been known previously as non-pierceable materials.
2. *Tubing having certain special cross-sections has been produced commercially.* This includes tubing having inside and outside shapes which are independent of each other, such as circular OD-finned ID, used to solve special heat transfer problems.
3. *Solids having special cross-sections have been produced.* These include shapes difficult or impossible to produce as rolled sections.

Through extrusion, Mr. Tubes, your local B&W Tubing Representative, has helped others to solve problems involving tubing and solids of special materials and cross-sections. Call on him if you have such problems; chances are he will be able to help you.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

B&W SEAMLESS and WELDED TUBES

TA-4019(X



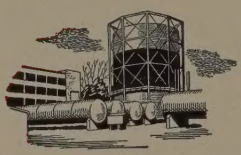
FLANGED-AND-DISHED HEADS MADE IN EIGHT TYPES By spinning and pressing, Bethlehem produces flanged-and-dished heads in these eight types: elliptical, tank car, obround-tank, flanged-only, double-dished, standard, shallow and ASME Code flanged-and-dished. Bethlehem Heads come in diameters up to 144 in., and in thicknesses from ⅛ in. to 3½ in. We also manufacture standard manholes and covers, hand holes and covers, flue holes, collar flanges and pipe flanges. If you would like full data on flanged-and-dished products, please write to the Bethlehem sales office nearest you. Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Philgas*

FOR INDUSTRIES



FOR UTILITIES

A Clean-Burning, Uniform LP-Gas!

RELIABILITY: You can depend on Philgas, a top-quality Phillips product, for uniform gravity and high thermal value. Exceptionally clean, too . . . free from harmful contaminants.

EASE OF USE: Automatic Philgas systems assure constant furnace temperatures and atmospheres . . . reduce operational worries . . . cut down on overhead.

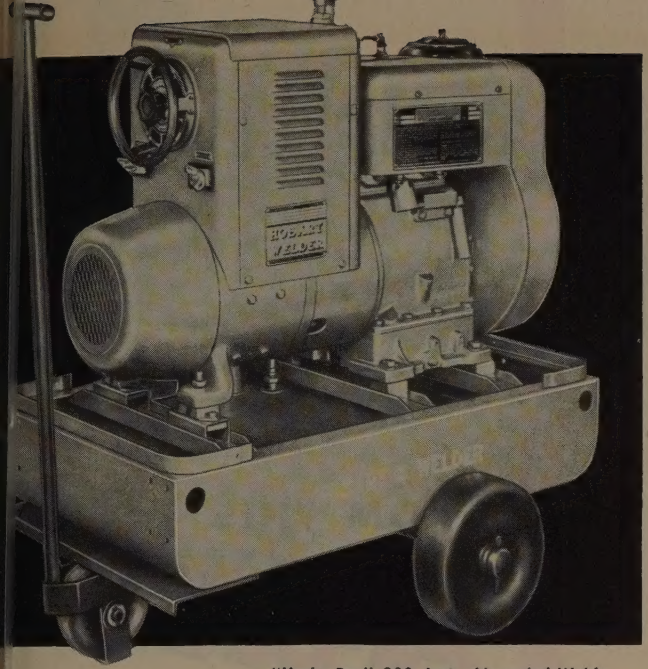
RECORD: Philgas is being used successfully by many of the nation's leading manufacturers for almost any operation where a uniform, clean, easily-controlled heat is needed. Many progressive utilities, too, are supplementing their output of natural or manufactured gas with dependable Philgas. It's America's largest selling brand of LP-Gas!

*Philgas is the Phillips Petroleum Company trademark for its high quality propane-butane LP-Gas or bottled gas.

Phillips 66 Philgas
THE ALL-PURPOSE FUEL

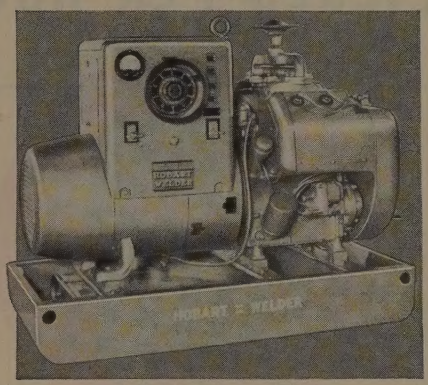
PHILLIPS PETROLEUM COMPANY
Sales Department • Bartlesville, Oklahoma

Offices located in Amarillo, Tex., Chicago, Ill., Denver, Colo., Des Moines, Ia., Indianapolis, Ind., Kansas City, Mo., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tampa, Fla., Tulsa, Okla., Wichita, Kans.



"Husky Boy" 200 Amp. Air-cooled Welder

Transformer Type AC Welder



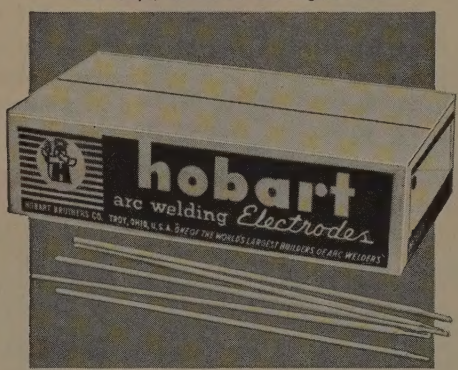
AC Welder—AC Power Unit.
200 Amp., Air-cooled Gas Engine Drive

New HOBART arc welders and electrodes make short work of those L—O—N—G welding jobs!

bart welders are built for tough jobs and have what it takes to them better. Extra capacity, cooler operation, rugged construc-n, extra convenience features . . . everything you need to get ter, easier, better welds.

With Hobart electrodes you're assured of better welds every e at the lowest possible expense. If higher production costs e cutting into your metal joining profits, write today for complete ormation. An actual comparison will prove that Hobart welders d electrodes will do your job better, faster and at lower cost.

OBART BROTHERS CO., Box ST-34, Troy, Ohio, Phone 21223



HOBART No. 10 ELECTRODE

For better welds right down to the stub, the Hobart (E-6010) gives better welding ease with a stable, deeply penetrating arc—deposits a smooth flat bead of high tensile strength and ductility—gives non-porous welds with quick, easy slag removal.

Prove to yourself this all-position DC electrode will give you faster, better welds at lower cost. ***Check coupon for free samples.***

Hobart *"One of the world's largest builders of arc welders"*

IP THE COUPON AND MAIL TODAY!

FREE

low to Get Better Welds"
A valuable vest pocket guide to better welding techniques and methods.

HOBART BROTHERS COMPANY, BOX ST-34, TROY, OHIO

Please send information on the items checked below.

☐ "Husky Boy" ☐ Free book "How to Get Better Welds" ☐ Transformer Type AC Welder ☐ AC Welder—AC Power Unit ☐ Free Electrode Samples

NAME_____

FIRM_____ POSITION_____

ADDRESS_____

HOBART WELDERS, ELECTRODES

822

PIECES PER HOUR

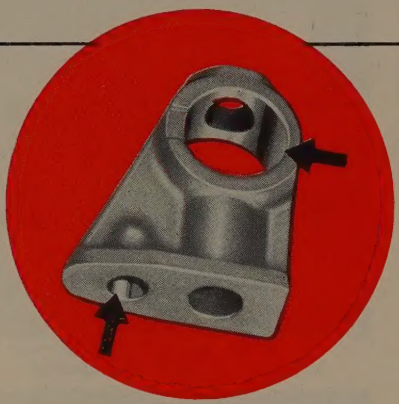
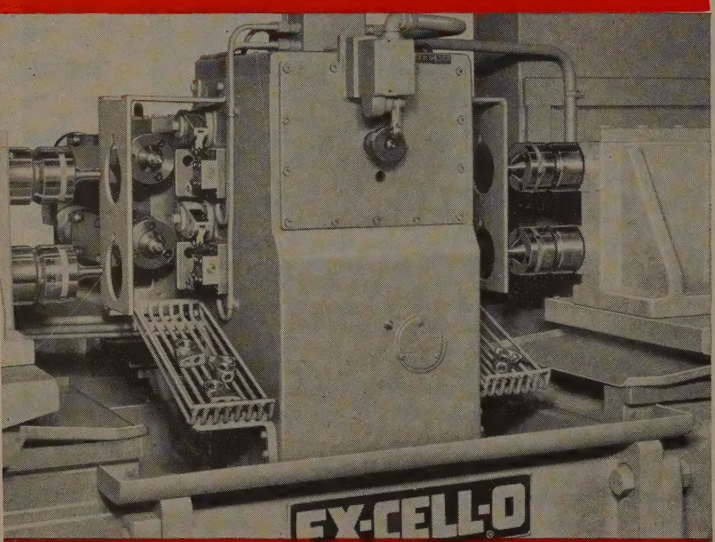
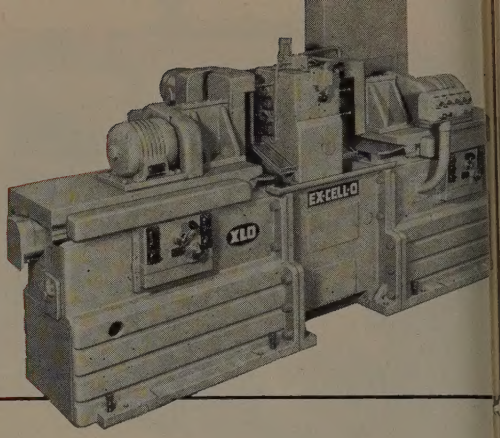


Photo above shows one of the die-cast aluminum workpieces. Arrows point to the bored holes which are held to plus or minus .0005". Four parts are machined during each cycle, netting 822 pieces per hour.



Two parts are held in each side of the fixture. Left and right slides bore 13/16" diameter hole through each part, while rear slide is boring 5/16" blind holes at right angles to the others. The work is unclamped and ejected automatically at the end of the machining cycle.



FROM THIS

EX-CELL-O

3-Way Machine

Works From 3 Directions Simultaneo

This Ex-Cell-O three-Way Precision Boring Machine consists of three standard, self-contained way units joined to a center sectio The left and right way units have two spindles each, mounted one above the other angle plate brackets. The rear unit carries four spindles, two on each side. The center section supports a fixture accommodating two parts on each side. Work is clamped and ejected hydraulically.

Ask your local Ex-Cell-O representative about all the other advantages of Ex-Cell-O Way Machines, or write today for Bulletin 31631.

XLO
EX-CELL-O for PRECISION

EX-CELL-O CORPORATI

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING
RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AI
AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQU

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 134 No. 10 March 8, 1954

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Editorial, Business Staffs—16. Advertising Index 208. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

ublished every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. ubscription in the United States and possessions, Canada, Mexico, Cuba, Central and South merica, one year $7.50; two years $15; all other countries, one year $20. Single copies (current sues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the post-ffice in Cleveland, under the Act of March 3, 1879. Application is pending for acceptance under ec. 34.64 P. L. & R. Copyright 1954 by Penton Publishing Co.

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EX-CELL-O for PRECISION

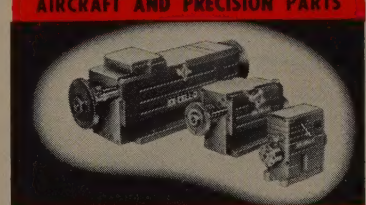
PRECISION MACHINE TOOLS

CONTINENTAL CUTTING TOOLS

PRECISION GRINDING SPINDLES

DRILL JIG BUSHINGS

AIRCRAFT AND PRECISION PARTS



HYDRAULIC POWER UNITS

Products of
EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN
51-18

(Advertisement)

what's NEW in Engineering

A synthetic soil conditioner has been announced which helps to control rain and wind erosion on construction sites, levees, rights of way and similar "bare ground" sites. Designed to stabilize aggregates on the soil surface, it helps to hold seeds and soil in place until vegetation cover takes over the job.

Deep-sea divers joined a small army of engineers and construction crews in driving over 42,000 piles at a riverside site for a Louisiana plant—to provide a stable foundation in mushy ground. Divers, working 40 feet down in the Mississippi River, were required to direct

placement of the concrete seal. We'll send you a 32-page illustrated book which tells how Kaiser Engineers is equipped to meet challenging problems—like this one at the nation's largest aluminum plant, which was producing metal in just 10 months.

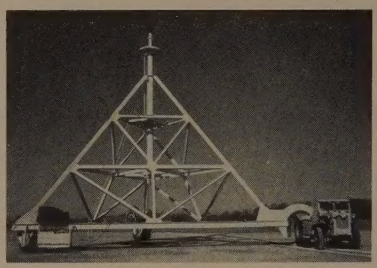
A pocket pyrometer, now on the market, gives direct reading of temperatures up to 3,300 deg. F. Only six and one-half inches long, it weighs about five ounces, and is shaped like a miniature telescope.

Whether it's designing an oil refinery, building a porcelain enameling plant or laying out a site plan, Kaiser Engineers undertakes the job with assurance because of the variety of talent within the organization. Successful experience in a wide field of design, engineering and construction tells the story. Call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

behind the scenes

Trying Triangles

How many triangles in this contraption? It's a new-type airship



mooring mast developed by Goodyear Aircraft Corp., Akron. We were so intrigued when we saw it in the February 15 issue of STEEL that we have been counting triangles ever since.

It is fast replacing Scrabble as our favorite after - dinner brain - scrambler. Just the thing for a pointless evening's entertainment.

Who Done It?

Dropped on our orange crate this morning by Gustav the ambidextrous office boy was an impressive packet of "love letters"—those complimentary missives from you folks that convince editors their sweating over special stories is not in vain. This latest batch we hadn't even known about. They were received by Sam Baker, our associate editor in New York, for his job in putting together the finale in our 1953 Program for Management series on the subject "Marketing Research."

Now we find that Sam is also responsible for the first installment in the 1954 series. You read it in the February 22 issue— "Now You Have to Sell."

This brings to mind a question posed recently: "Who writes this Program for Management series?" Actually, the articles are spread out among STEEL's well-balanced staff. Walt Campbell, John Morgan, Al Gray, Bill Rooney, Floyd Lawrence and Sam Baker all handled assignments in last year's series. An editorial task force plans the subjects, the researching, interviewing and writing is assigned to one editor. His final draft is worked over by several editors and improvements written in to the story. Illustrative material is gathered by the editor-in-charge and art department interpretations are shaped up in joint editor-artist conferences. The series aims to throw into bold relief critical problems facing metalworking management today.

As each article is written in STEEL's fast-reading, informative style, it's no wonder our questioner thought all the series had been written by the same editor.

Naturally . . .

This quiet little piece of left-handed flattery gave us a tiny lift one day last week. It was a letter from W. J. Ash, vice-president of Nelco Metals, Inc., Canaan, Connecticut.

All the letter said was, "We are trying to locate the present whereabouts of Mr. Peter Bjurberg. In 1945, Mr. Bjurberg was Electrical Furnace Superintendent, Atha Works, Crystal Steel Company, Harrison, N. J. In 1948, he held the same position for Universal Cyclops at Bridgeville, Pa. With the thought that Mr. Bjurberg would certainly be a STEEL subscriber, we would appreciate his present address."

Mr. Ash was correct. Mr. Bjurberg is a STEEL reader.

When we told Mr. B about Mr. A's inquiry he replied, "You folks may give anybody my address who may inquire through you about it."

Now, we're not soliciting business for a Bureau of Missing Metalworking Persons but, frankly, we're doggoned proud of the fact that our circulation files contain the names, titles and addresses of the most important men in metalworking. We're powerful glad to include you among them.

Shrdlu

(Metalworking Outlook—Page 65)

INSUL-MASTIC, of course!

Once and for all these Oil Refinery Tanks are being coated with INSUL-MASTIC TYPE "D"

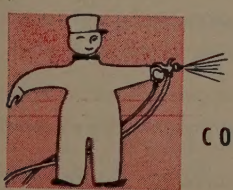
Once an INSUL-MASTIC protective coating is applied it will prevent corrosion for practically *all* time.

INSUL-MASTIC is a heavy asphaltic coating, fortified with Gilsonite and reinforced with mica, asbestos and ceramic clay. It is applied in one thick coat and will prevent corrosion under extreme conditions such as acid or alkali fumes or constant moisture. INSUL-MASTIC TYPE "D" contains cork, an excellent insulator. When applied ¼" thick on heated tanks it will cut your fuel bills considerably.

We can show you applications many years old in plants where constant painting was once the rule. These INSUL-MASTIC coatings have not been renewed since they were applied several years ago. They have saved considerable maintenance money for their owners.

Think first of one coatings that last!

Before you build, take advantage of our consultant service. Proper coating recommendations now will prevent corrosion worries and expenses later.



Insul-Mastic

CORPORATION OF AMERICA • OLIVER BUILDING, PITTSBURGH 22, PA.

Representatives in Principal Cities

THREE BROACH USERS TELL WHY

INDUSTRIAL POWER . . .

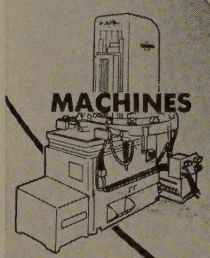
. . . "We like Colonial broaches because of their accuracy, dependability, and service rendered by the company and their representatives . . ."

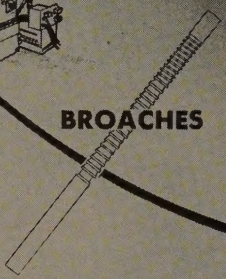
ELECTRONICS . . .

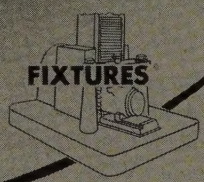
. . . "It has been our experience that Colonial broaches have given us most satisfactory results. Quality, workmanship and tolerances furnished on these broaches are a definite asset to our company . . ."

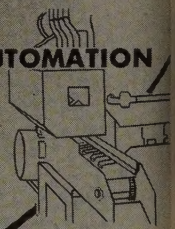
COAL MINING EQUIPMENT . . .

. . . "We are well satisfied with the performance of Colonial broaches in regard to tool life, low maintenance, and close tolerances, which they must hold. A big factor is that in the event of a rush or a break-down job, we have learned to depend on Colonial getting broaches to us very quickly, thus avoiding long shutdowns . ."



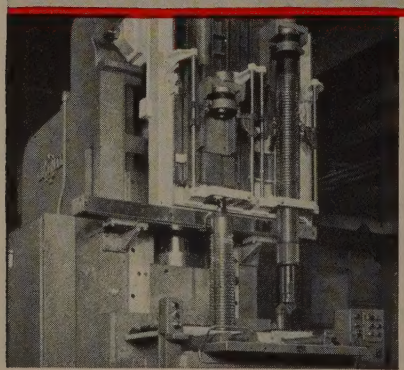






COLONIAL BROACH CO. DETROIT 13

Unified Broaching



NO BROACH HANDLING - ½ *the Work Handling*

A big gain in efficiency as well as a reduction in cost results when there is no broach handling between passes in the two-step broaching of large parts. The Colonial dual sliding broach handling support handles the two broaches automatically and permits two-pass broaching with only one handling of the work piece.

The entire cycle through both broaching passes is automatic on this Colonial 50-ton, 72-inch stroke, pull-down broaching machine.

This is a Colonial Unified Broaching Installation.

Vapor-from-paper stops rust!

Saves greasing, saves degreasing

as *clean* as the photo shows.

This modern way to ship or re parts completely eliminates shing or dipping with inflam- ible compounds . . . so greasing is saved.

Angier VPI* Wrap gives off a por that protects those metal rts in about the same manner at moth balls protect woolens. at you can store metal with VPI for years and not find a trace of rust.

This fast, clean way to protect metal saves labor at every turn. That's being proven every day by the military and in all the industries you see mentioned in the coupon. Send for "VPI Facts" that apply to you.

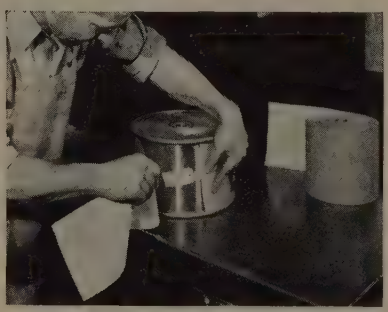
*®Vapor rust preventive. Angier VPI Wrap (2 gram) is made to conform to the government's specification on volatile rust inhibitors—MIL P 3420.

Does *your* management know about VPI?

Protective papers for industrial, building and farm needs since 1895. Distributors in Principal Cities.

Angier

Parts for export are VPI-wrapped at critical points, then put in VPI-lined crates for sure protection from rust.



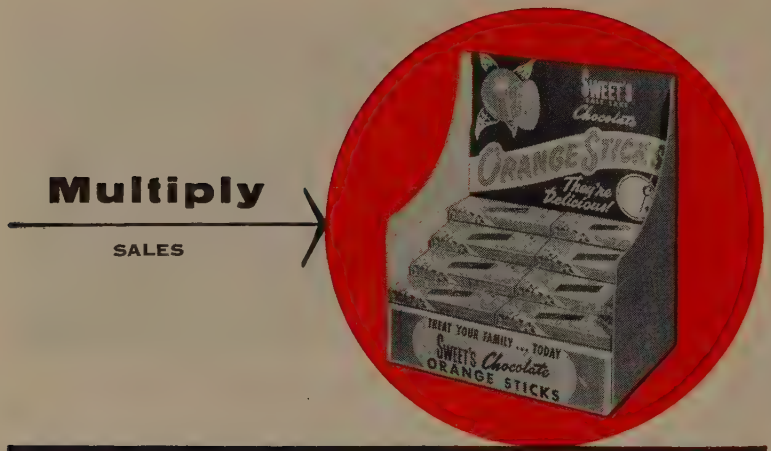
Angier VPI comes in rolls. Also sheet, tube, and envelope form to protect the metal products you store or ship.

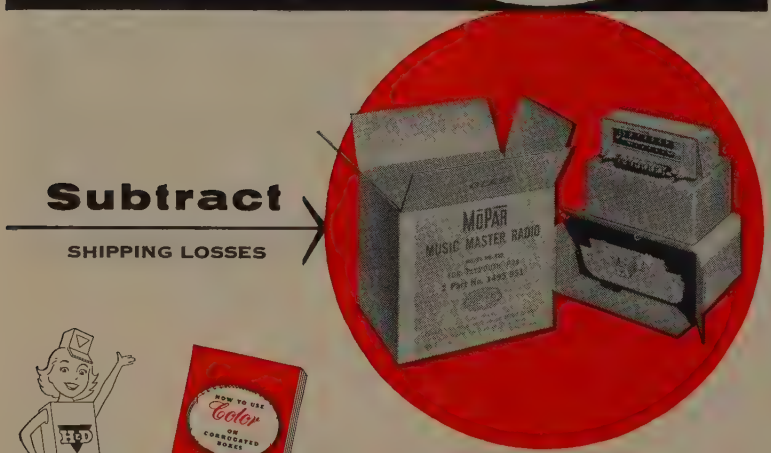
Free sample *for your tool box...*

Angier Corporation, Framingham 8, Mass.
Send sample & *VPI FACTS* as applied to

- ☐ Machinery-Industrial, Metal Working, Farm, Office, Construction.
- ☐ Steel in process of fabrication.
- ☐ Electrical Machinery, Appliances, Products.
- ☐ Instruments and clocks.
- ☐ Fabricated Products—Cutlery, Hardware, etc.
- ☐ Ordnance Equipment.
- ☐ Transportation Equipment—Aircraft, Auto, Naval, Railroad, etc.
- ☐ Others:

Name, Title (Sign and clip to letterhead)





Write for free booklet,
"How To Use Color On Corrugated Boxes."
Hinde & Dauch, Sandusky 47, Ohio

HINDE & DAUCH

Authority on Packaging

LETTERS TO THE EDITORS

Translation for Danes

Our Danish representatives have written to us in regard to your article "Centralized Lubrication, Elixir for Machine Life" (Dec. 7, 1953, p. 136). They feel that this is an excellent printed piece and would like to obtain permission to have it translated and published in a Danish and Swedish technical paper.

We would appreciate receiving your permission for that translation and reprinting.

D. H. Rowe
advertising manager
Farval Corp.
Cleveland

• *Permission granted.—ED.*

Future in Metal Powders

I read your article "Metal Powders Ease Production Headaches" (Jan. 25, p. 88) and consider it instructional and an eye-opener as to a future business for a young man. My son will be entering college in September and shows great interest in powder metallurgy as a career. Please advise where further information can be gotten on this subject of powder metallurgy.

William K. Odoy
173 Hodge Ave.
Ansonia, Conn.

• *We suggest you contact the Metal Powder Association, New York.—ED.*

I would like to obtain four or five reprints of these articles:

"Metal Powders Ease Production Headaches" (Jan. 25, p. 88)

"Navy Develops New Magnetic Material" (July 28, 1952, p. 76)

Allen B. Schall
U. S. Graphite Co.
Saginaw, Mich.

Please send us a copy of "Metal Powders Ease Production Headaches."

Eugene M. Tommey
Armco Steel Corp.
Middletown, O.

• *Being sent.—ED.*

Cost Figures Requested

We are currently examining products or components of products to determine whether a particular plastic can provide greater service per unit cost than competitive materials. Costs of fabrication, tooling costs, the level of production and materials costs are all important factors. While we can do a reasonable job on plastics products we are limited in our knowledge of the fabrication costs and tooling costs for various levels of

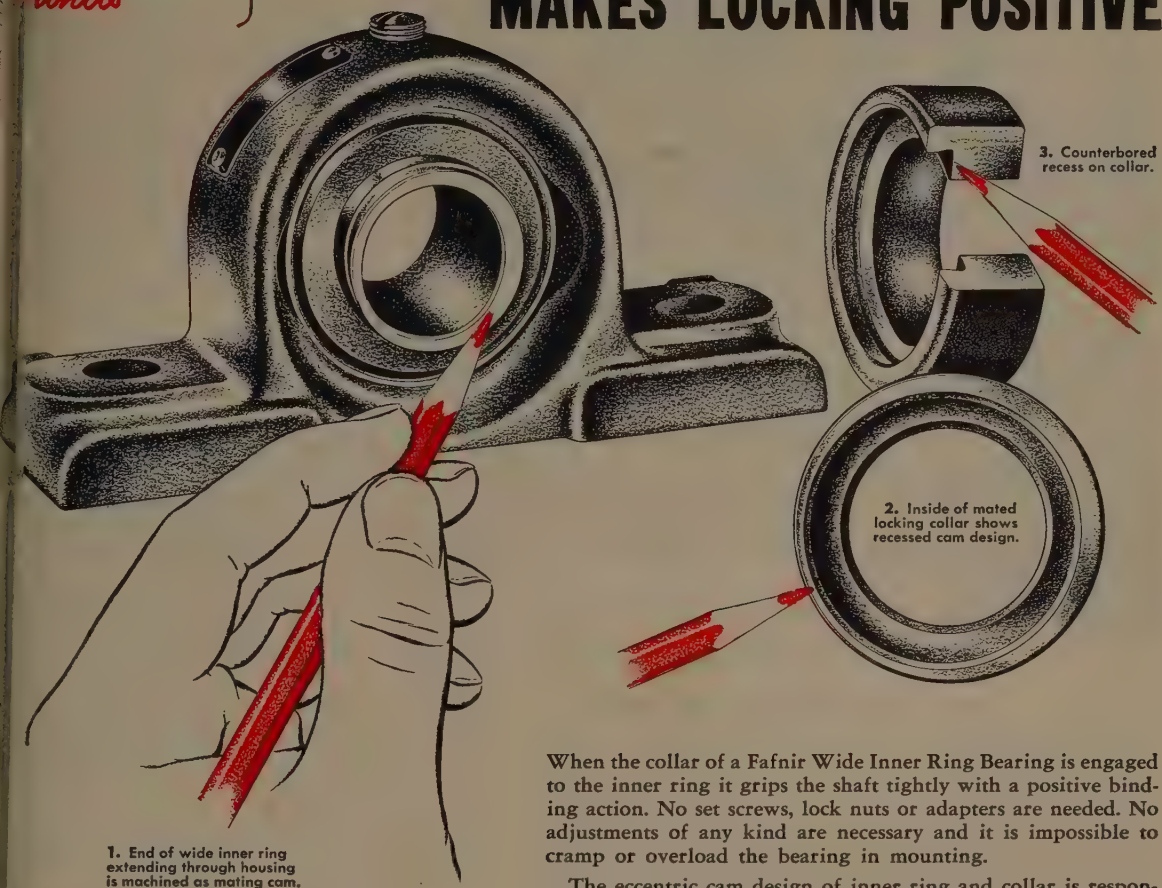
Please turn to p. 12

reference points on power transmission units

ECCENTRIC CAM DESIGN

of Inner ring and collar

MAKES LOCKING POSITIVE


3. Counterbored recess on collar.
2. Inside of mated locking collar shows recessed cam design.
1. End of wide inner ring extending through housing is machined as mating cam.

When the collar of a Fafnir Wide Inner Ring Bearing is engaged to the inner ring it grips the shaft tightly with a positive binding action. No set screws, lock nuts or adapters are needed. No adjustments of any kind are necessary and it is impossible to cramp or overload the bearing in mounting.

The eccentric cam design of inner ring and collar is responsible for this extremely valuable feature. It's a Fafnir development . . . tried and proven over the years. Shaft scoring is no longer a problem . . . and shaft slippage is out. The Self-Locking Collar transmits all thrust loads to the bearing.

For straight shaft mounting, the Fafnir Wide Inner Ring Bearing with Self-Locking Collar continues to rate "tops" as a feature of power transmission units. Every day it makes possible greater simplicity of mounting, economy of design, assembly and maintenance costs. For details call your Fafnir Representative. The Fafnir Bearing Company, New Britain, Conn.

PILLOW BLOCKS
. . . standard and heavy series

FLANGE CARTRIDGES
. . . standard and heavy series

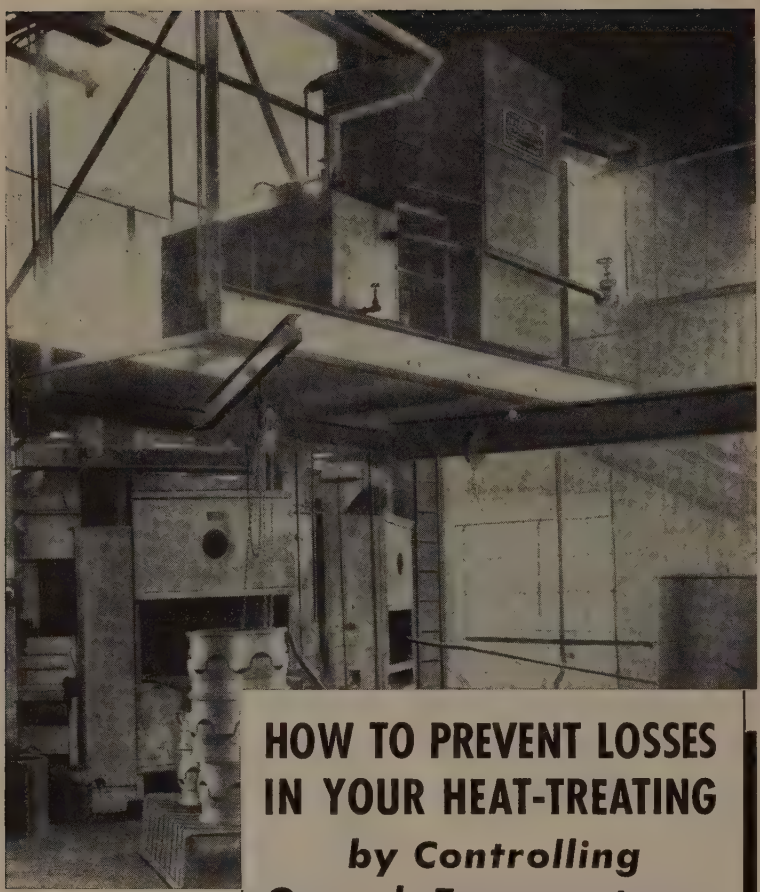
CYLINDRICAL CARTRIDGES
. . . . standard and heavy series

WIDE INNER RING BALL BEARINGS
. . . with Mechani-Seals

FAFNIR

BALL BEARINGS

MOST COMPLETE



HOW TO PREVENT LOSSES IN YOUR HEAT-TREATING

by Controlling Quench Temperatures

● Using Niagara's AERO HEAT EXCHANGER to cool your quench bath never fails to give you real control of the temperatures at which you wish to quench.

Your experience will be the same as others who have installed this method. You'll get better physicals; save losses and rejections; increase heat-treating capacity and production with lower costs. You can put back heat into the quench bath to prevent the losses of a "warm-up" period. You remove heat at the rate of input and prevent flash fires in oil quench baths.

You'll save space in your heat treating department and get a more productive arrangement because less room is needed for coolers and tanks. You'll find savings in piping, pumping and in the amounts of oil you will have to buy. And the saving in the cost of cooling water alone is enough to repay the cost of the Niagara Aero Heat Exchanger, usually in less than two years.

Write for Bulletin 120 and further information

NIAGARA BLOWER COMPANY

Dept. S, 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

LETTERS

Concluded from p. 10

production of metal products. We hav gained appreciably from articles i STEEL. These, however, admittedly a general in nature and cost conclusion are qualitative rather than quantitativ With a particular product and level o production in mind, we are hard put t establish accurate mill cost and sellin price estimates.

Is it possible to obtain a cost esti mating system for metal products or a least data from which such a systen might be developed?

Robert S. Mallou
Research Divisio
Polychemicals Departmen
E. I. du Pont de Nemours & Co
Wilmington, De

● *The cost information which you request is, as far as we know, unavailable. We suggest you write directly to companies that keep good cost figures and explain what information you are seeking.—ED.*

Long-Range Selling Job

We would appreciate 35 or 40 copies of your article "Marketing Research," No. 10 in STEEL's Program for Management for 1953 (Dec. 7, p. 126). Our "selected" mailing list consists of no more than 40 top management people directing the largest industries in the St. Louis area. Your article should be must reading for some of these executives who are not fully aware of the advantages of marketing research. It's a selling job that we have been trying to do for some time.

Syd Blumenthal
Marketing Counsel & Research Co.
St. Louis

Will you kindly forward a tear sheet of your "Marketing Research" article?

John E. Oliver
director, associated products
Northrop Aircraft Inc.
Hawthorne, Calif.

● *Sent.—ED.*

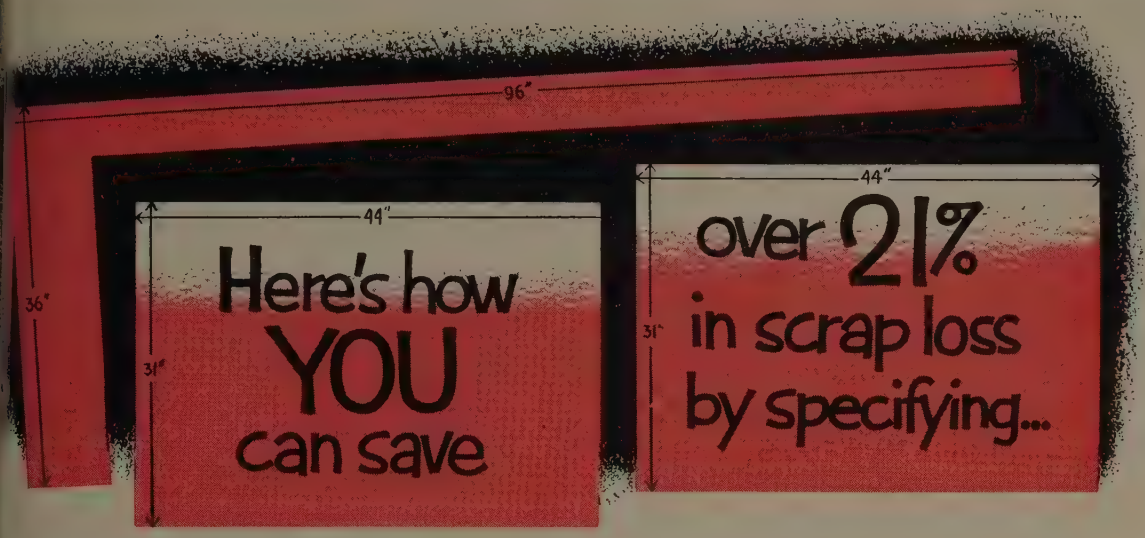
A Name in Cylinders

We greatly appreciate the write-up in your "Technical Outlook" on our high pressure cylinders (Feb. 15, p. 107). However, we note that you have given the credit to Worcester Pressed Steel Co. instead of the Hi-Pac Division of Worcester Pressed Steel Co.

We are very anxious to continue and further promote the name Hi-Pac because of its previous acceptance in the cylinder field, and would appreciate all subsequent releases on cylinders being credited to the Hi-Pac Division of Worcester Pressed Steel Co.

Lyndon B. Burnham
sales manager
Worcester Pressed Steel Co.
Worcester, Mass.

● *Done.—ED.*



DOLAN Steel Blanks and Strips

CUT TO YOUR EXACT SPECIFICATIONS!

Plus Money Saved On

- estimating and cost controls
- inventory investment
- handling costs
- storage costs
- cutting and labor charges
- overhead

If your requirements call for a 31" x 44" sheet of flat rolled steel, you would realize two pieces out of a standard 36" x 96" sheet. But your scrap loss in this case would amount to over 21% of the total steel bought. This is a prime example of the way Dolan's steel blanks and strips can save you money.

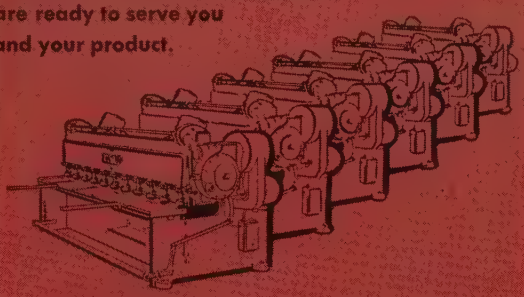
Of uniformly high quality steel in extremely close gauge tolerances, Dolan's steel blanks are cut to your exact size, finish, temper, gauge tolerance and quantity from 28 gauge to 1/4" thick and delivered promptly from stock! *AND NO SCRAP LOSS!*

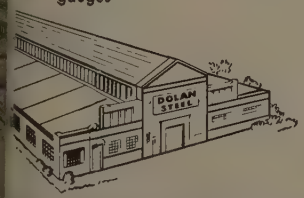
Phone Dolan Steel now . . . tell us *your* requirements and we'll show you what *your net* savings will be by specifying Dolan's Steel Blanks.

Full Facilities For:

- Shearing sheet stock up to 3/8" thick
- Slitting coils up to 48" wide to your specifications
- Decoiling and leveling steel in gauges from .015 to .187 — widths to 52"
- Supplying sheet and strip steel in all finishes, tempers and gauges

Dolan's six modern power shears are ready to serve you and your product.





DOLAN Steel Company Inc.

810 Union Avenue Bridgeport 7, Conn.
Phone 5-8173

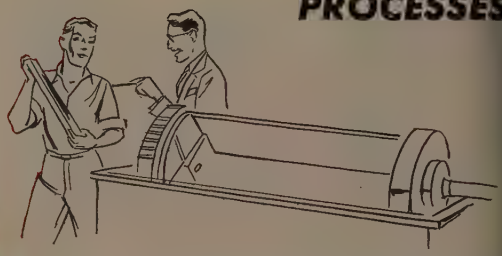
NEW ENGLAND'S LARGEST STEEL WAREHOUSE, FLAT ROLLED STEEL, EXCLUSIVELY, SERVING NEW ENGLAND, NEW YORK AND NEW JERSEY

THE SEYMOUR LINE AT A GLANCE

NICKEL ANODES

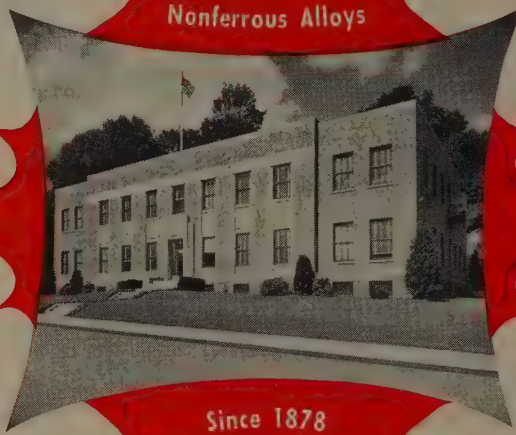
Uneven corrosion and release of foreign matter and excessive "sludge" militate against, often prevent, formation of an even, integrated plate of good color. Such "little foxes" are more or less traceable to imperfect grain structure in the anode. Seymour "Controlled Grain" Nickel Anodes have homogeneous grain. They are made of virgin nickel poured under accurate pyrometric control. As a result, Seymour Anodes corrode evenly, eliminate many headaches.

BRIGHT NICKEL PROCESSES



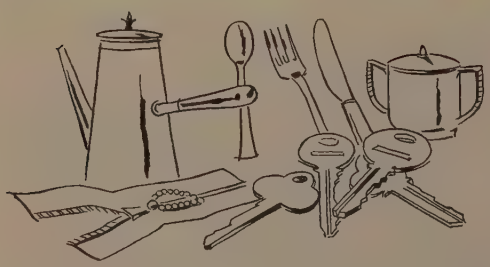
Available for warm or cold plating baths, Seymour Bright Nickel Processes accelerate work and improve results. Write for complete information.

Nonferrous Alloys



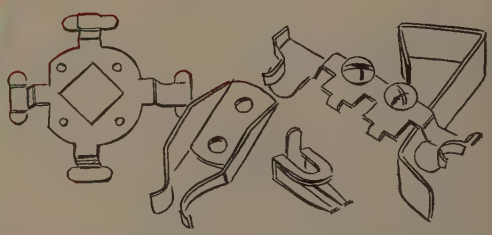
Since 1878

NICKEL SILVER



Seymour Nickel Silver is an ideal silvery white base for plated ware, a smooth-flowing alloy for spun and drawn articles. Free-cutting, non-corrodible, it is excellent for screw-machine products. It is widely used in the manufacture of keys, zippers, musical instruments, fine plated silverware, surgical instruments, fishing tackle, spectacle frames, etc.

PHOSPHOR BRONZE



The qualities of Seymour Phosphor Bronze—toughness, resiliency, and resistance to fatigue and corrosion—make this wonder metal ideal for a wide bracket of spring, electrical, and machined parts. Its range of grades and tempers gives the designer a selection of alloys to fit the job. Glad to furnish technical data and samples.

THE SEYMOUR MANUFACTURING COMPANY • SEYMOUR, CONNECTICUT, U.S.A.

LIGHT IN THE NIGHT...

Spearing across the snows
of Canada shines this headlight.
But for refractory brick,
the arc wouldn't spark to flash
the headlight, the stainless
steel with which the car is built
would not exist . . . the trucks
she rides on, the motors and the
generators, even the glass . . .
depend for their existence upon
quality refractories
such as Grefco supplies
the world.

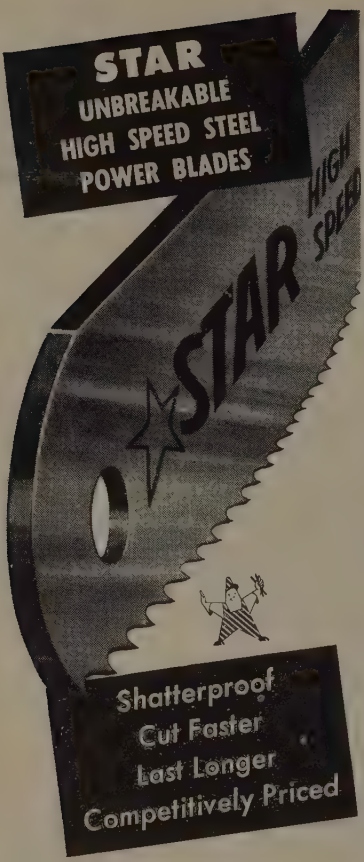
Budd Rail Diesel Car on the
Canadian Pacific Railway

GREFCO

GENERAL REFRACTORIES COMPANY
Philadelphia

Products of fame.. wherever there's flame

GENERAL REFRACTORIES COMPANY



For superior cutting performance with *safety*, insist on Star Unbreakable High Speed Steel Flexibles. No premium price for safety, fast cutting and long life.

They are made with a high speed steel toothed edge, welded by a special process to a flexible steel back. Eliminate tearing along weld—shattering—flying pieces.

Order Star High Speed Steel Flexibles from your Star distributor. And remember, he carries the leading lines of all kinds of tools and industrial supplies. And on extra-difficult metal sawing problems, he will quickly get a Star factory representative to help you.

Sold Only Through Recognized Distributors.

3233

CLEMSON BROS., Inc.

MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hack Saw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Hand and Power Lawn Machines.

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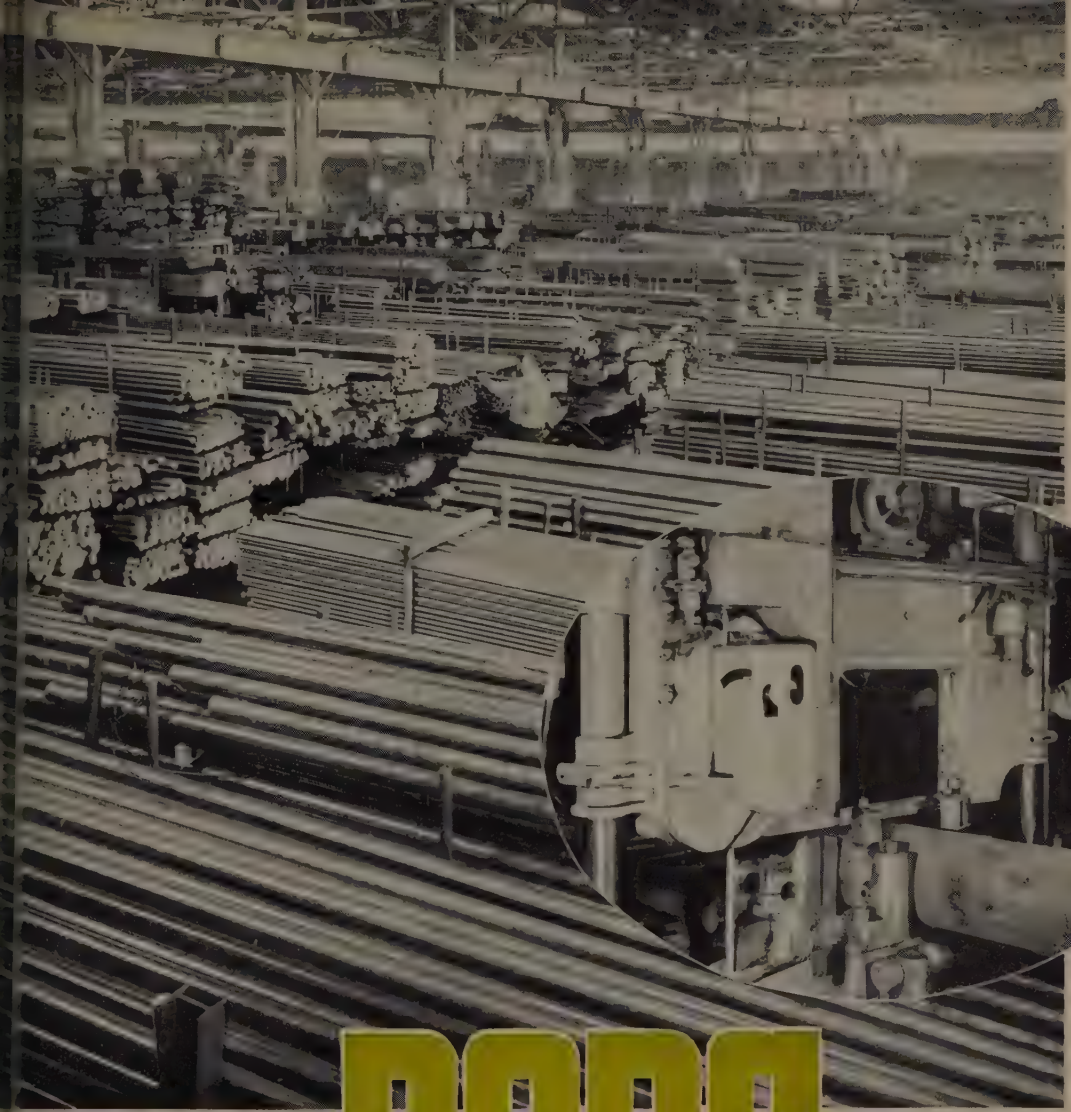

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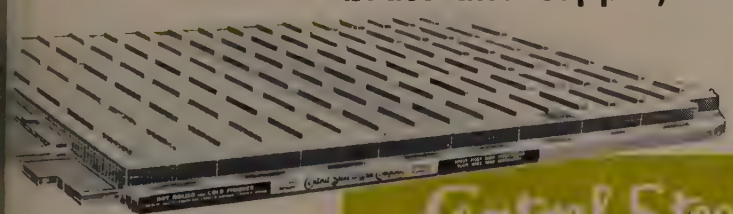
HOT ROLLED • COLD FINISHED

carbon and alloy, stainless steel

brass and copper, aluminum



many analyses in a wide range of sizes, cut to your multiple lengths

Central Steel & Wire Company

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New York City Skyline from New Jersey

Shostal Press Agency Photo

BULLARD

The Invisible Background of Industrial Progress

Modern high-speed roadways with their connecting tunnels and bridges make possible swift and economical surface movement of industry's raw materials and finished products from their source to the ultimate user. Those engaged in agriculture also depend on this means of transportation to move their produce from farm to processor to consumer. Modern American families rely on these modern roads in their pursuits of pleasure, vacation and business.

Likewise, *Modern Machine Tools* provide the manufacturers of road-building equipment, such as mechanical shovels, bulldozers, trucks and road rollers, with efficient means for manufacturing such essential equipment. Here then is "The Invisible Background of Industrial Progress."

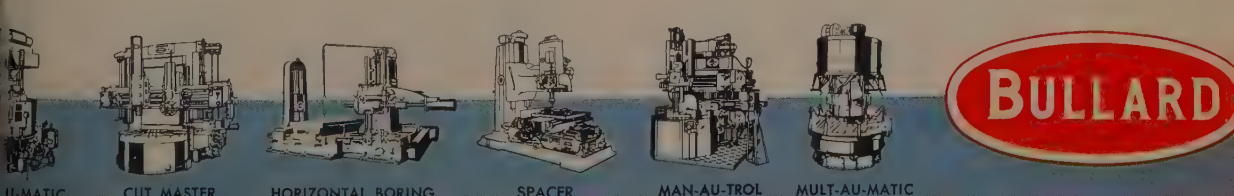
THE BULLARD COMPANY • BRIDGEPORT 2, CONNECTICUT

Available in six sizes
30″ through 74″

New products, new methods, new materials, and new cutting tools have out-dated many machine tools still in use. Is your plant operating under this handicap? If so, it will pay you to investigate the Bullard Cut Master Vertical Turret Lathe.

In the Cut Master, you will find a machine that incorporates outstanding engineering developments which make for increased production, ease of handling, accuracy, minimum operator fatigue and decreased maintenance cost. All these add up to greater profits through lower costs — so important in today's competitive market.

For full details on the Bullard Cut Master Vertical Turret Lathe, call your nearest Bullard representative or write to The Bullard Company, 286 Canfield Avenue, Bridgeport 2, Connecticut — phone 6-2511.



EXPANDED METAL *for distinctive furniture*

Light weight, strength and attractive appearance were the reasons why The Hettrick Mfg. Co. of Toledo, Ohio, chose Penmetal Expanded Metal for the steel chair and glider pictured above.

Penmetal expanded metal is sheet metal that has been slit and expanded up to ten times its original width. None of the metal is lost in the process, nor is the strength of the sheet reduced. In fact, the formation of the diamond truss pattern adds to the rigidity and strength of the sheet.

Available in carbon steel, aluminum, stainless steel, Monel, Inconel and other metals, Penmetal expanded metal is as much as 80% lighter than solid sheet of the same dimensions. It can be cut, formed or shaped; welded, brazed or soldered; can be used plain, or can be galvanized, tinned, polished, plated, painted or enameled. Large or small mesh, light or heavy gauge.

Send for catalog which gives mesh sizes, weights and dimensions, and shows many profitable ways in which you can use Penmetal expanded metal. No cost or obligation.

PENN METAL COMPANY, INC.

General Sales Office: 205 East 42nd Street, New York 17, N. Y.

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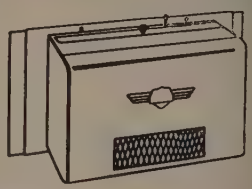
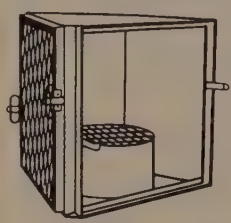
PM-21

...and for thousands of other uses



Air Conditioning Unit Grille



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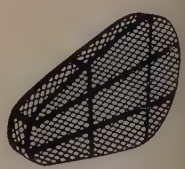
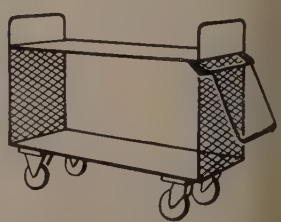
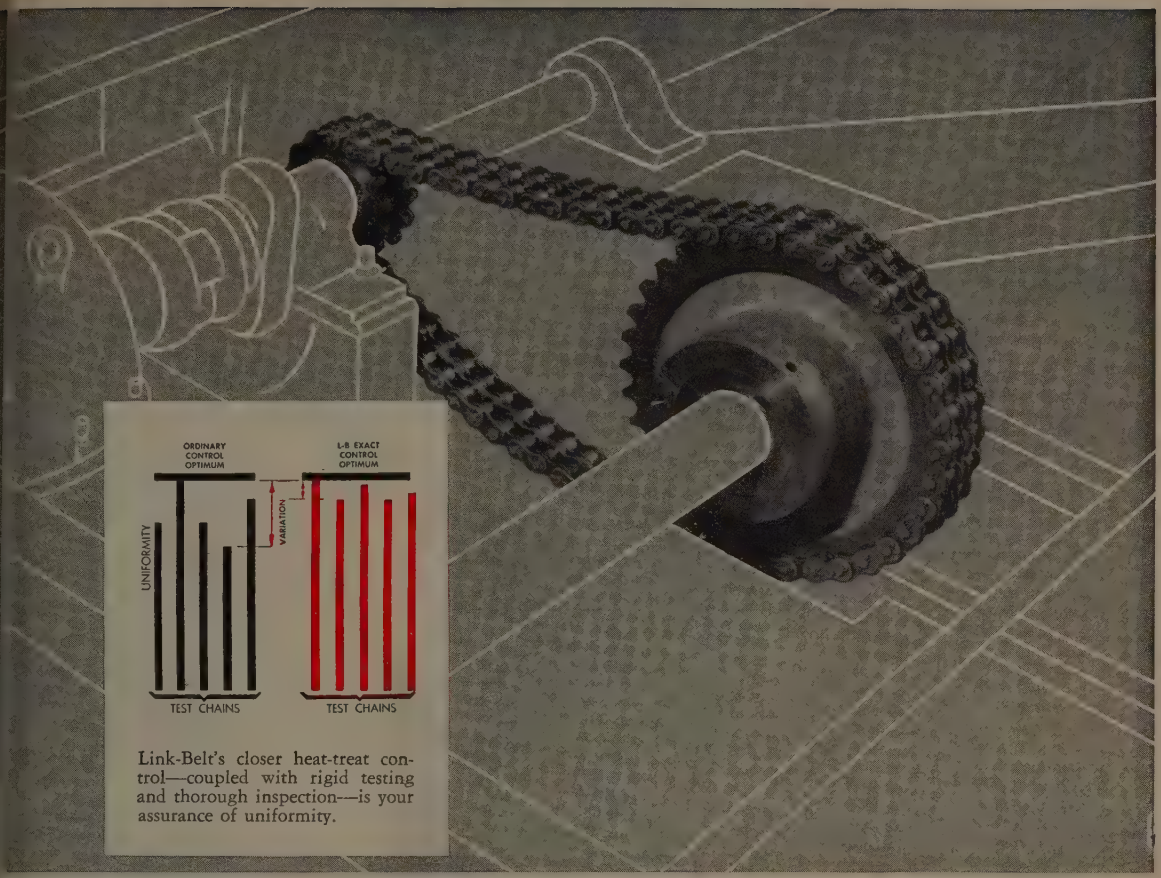


Machine Belt Guard

Platform Step Ladder



Baggage Truck



Link-Belt's closer heat-treat control—coupled with rigid testing and thorough inspection—is your assurance of uniformity.

Closer heat treat control means longer roller chain life!

But it's only one of many engineering extras you get from LINK-BELT

THE long-life record of Link-Belt Precision Steel Roller Chain is based on more than closer heat treat control. Consider such extra-wear features as shot-peened rollers and lock-type bushings. They're further assurance of Link-Belt's *built-in* extra life.

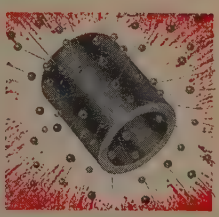
Link-Belt Roller Chain is available in single or multiple widths, 3/8" through 3" pitch. Double pitch, 1" through 3". For all the facts, call the Link-Belt office or distributor near you today, or write for Data Book No. 2457.

LINK-BELT

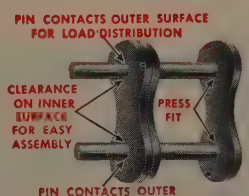
ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13.120-A

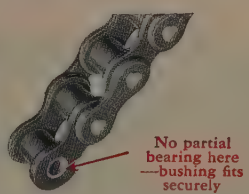
Don't overlook these other LINK-BELT extras



Shot-peened rollers have extra fatigue life for higher speeds, heavier loads.


PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION
CLEARANCE ON INNER SURFACE FOR EASY ASSEMBLY
PRESS FIT
PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION

Couple, uncouple multiple-width chains easily.

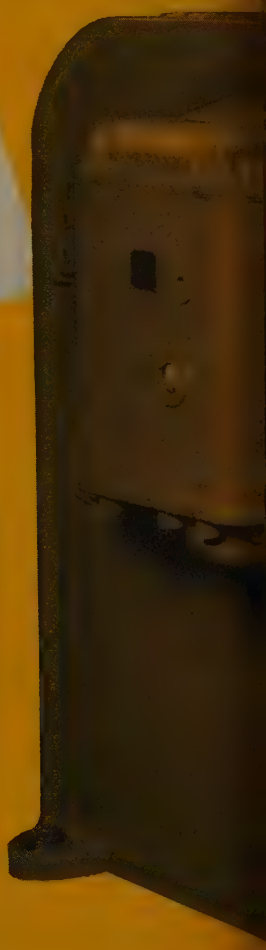


Lock-type bushings assure free articulation.

CINCINNATI accurately

1/2" plate and 20 gauge sheets

...without changing knife clearance



. . . You do not change knife clearance for successful shearing of different thicknesses on a Cincinnati. Just set the clearance for the thinnest material and shear all thicknesses up to capacity. Thousands of Cincinnati Shears are used continuously in this manner. This practical method prevents accidental damage — saves time. Remember, changing knife clearance interrupts production.

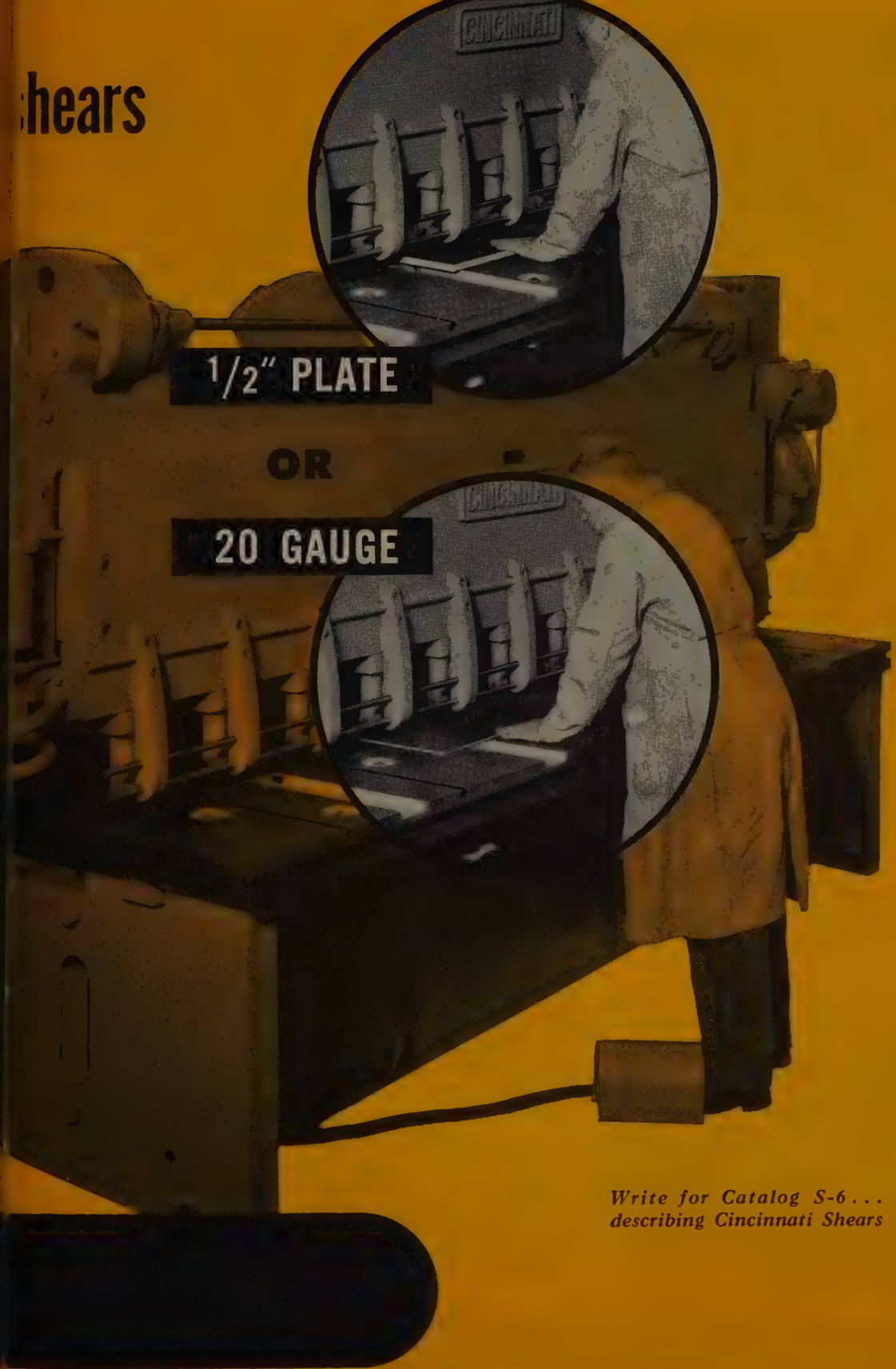
Sharp knives are a necessity for satisfactory shearing, especially on very light gauges. Remember, changing knife clearance does not sharpen dull knives. We suggest you write for data sheet on knife life.

CINCINNATI

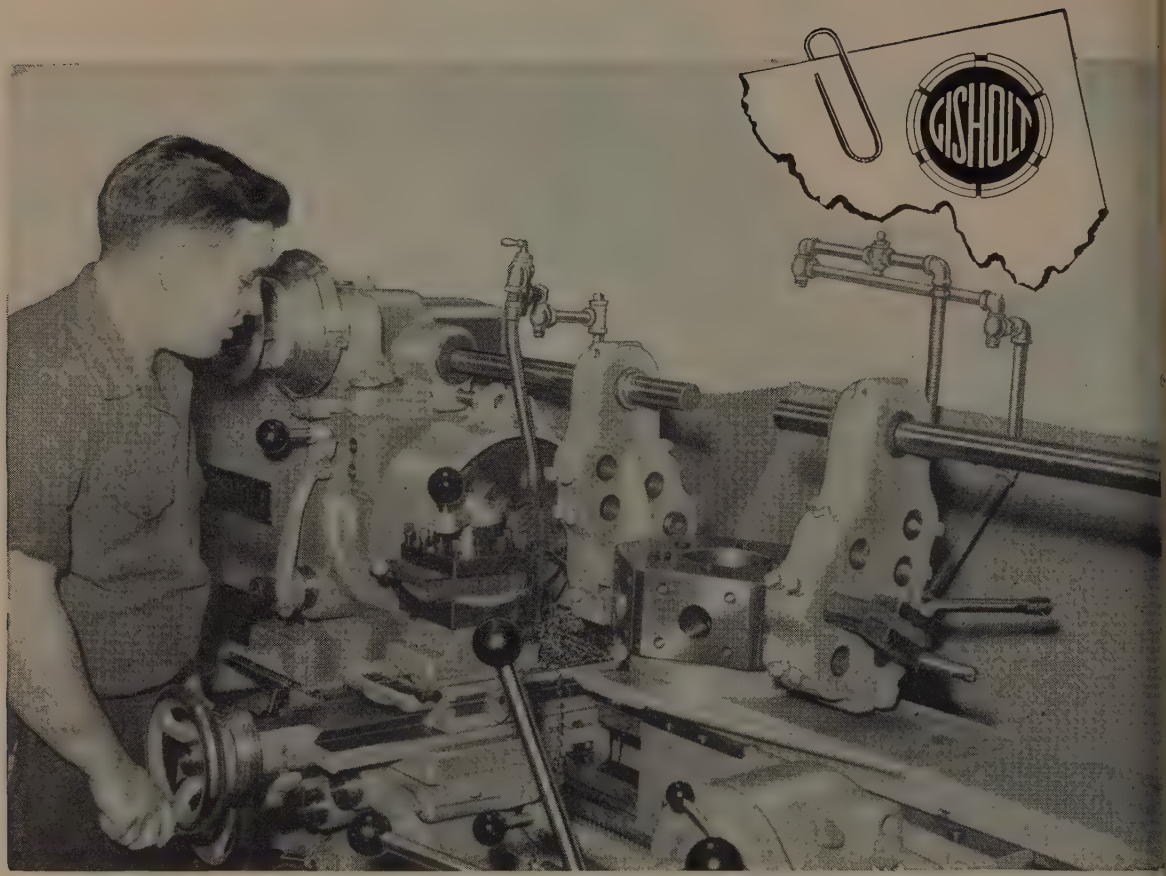
THE CINCINNATI SHAPER CO.

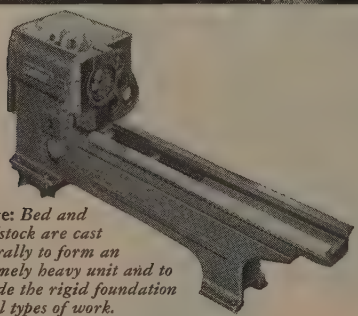
CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

shears



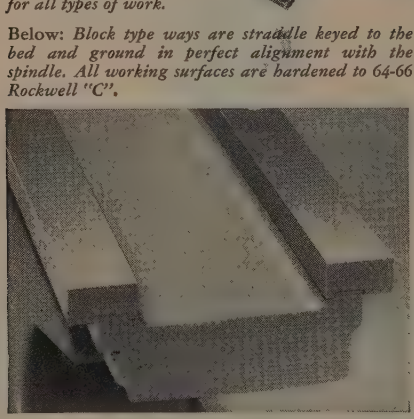
Write for Catalog S-6 . . .
describing Cincinnati Shears





Above: *Bed and Headstock are cast integrally to form an extremely heavy unit and to provide the rigid foundation for all types of work.*

Below: *Block type ways are straddle keyed to the bed and ground in perfect alignment with the spindle. All working surfaces are hardened to 64-66 Rockwell "C".*



ACCURACY THAT DOESN'T "WEAR OFF"

Here are two good reasons why you can count on the accuracy of Gisholt Turret Lathes—now and years from now.

One-piece bed and headstock, cast as a heavy, rigid unit, reduce distortion and vibration to a minimum. Headstock is jig-bored to insure—and maintain—perfect alignment of spindle and drive shafts, with ample metal to provide the most solid support possible.

Hardened steel ways are augmented by hardened steel strips secured to the ram saddle, as well as hardened steel gibs and clamps, making an assembly that is virtually wear-proof. Its accuracy is further preserved by force lubrication.

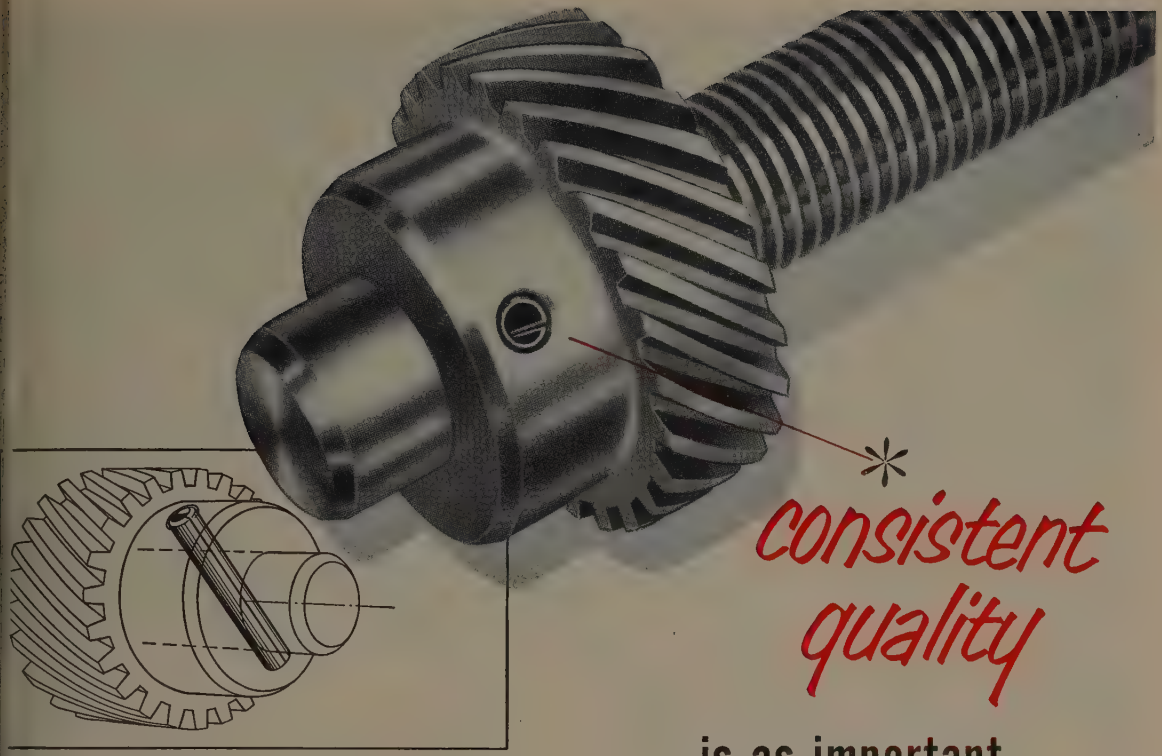
These advantages are yours for the long life of any Gisholt Turret Lathe. Ask for complete details.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

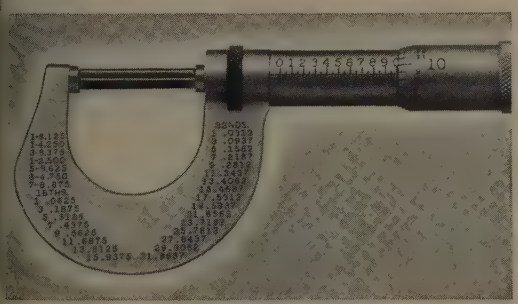
TURRET LATHES · AUTOMATIC LATHES · SUPERFINISHERS · BALANCERS · SPECIAL MACHINES



consistent quality

is as important in the pin as in the gear

o function effectively, a spring pin must drive easily into les drilled to normal production tolerances, compressing driven. To drive easily, hold firmly and fit flush, the pin *very* pin—must meet the strict requirements of specifica- ons such as those prepared by the SAE and the Military rvices.



ince failure of a pin can be as costly as a failure of any ther precision part, it is important to check the pins *you* uy for uniformity . . . uniformity of diameter and length, hear strength, hardness, insertion and removal forces, and ecovery of diameter.

Rollpin has been tested many times—by many manufacturers—with a consistently high performance record. It has been widely recognized as the "quality" fastener of its type. In this case, quality can be—and should be—measured. We strongly urge that you test for quality when buying spring pins.

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. R28-360, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send the following free fastening information:

- ☐ Rollpin samples
- ☐ Rollpin bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

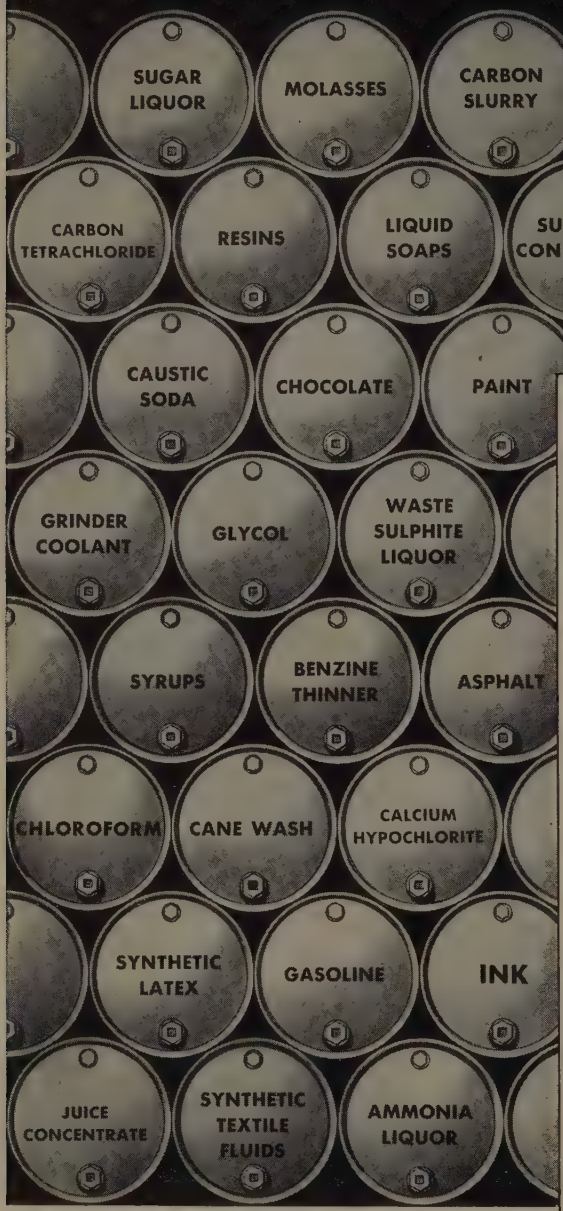
Name_____ Title_____

Firm_____

Street_____

City_____ Zone____ State_____

Which of these is your pumping problem?

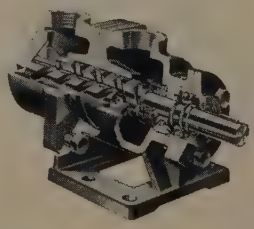


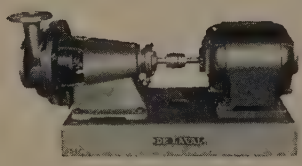
Name just about any fluid you consider "hard to handle" and we will show you a De Laval pump that will do the job efficiently and at low cost.

De Laval IMO and CPO pumps have solved problems on a wide range of products—hot or cold, acidic or alkaline, viscous or corrosive, clear or filled with suspended solids. IMO and CPO models are available for early delivery.

Your De Laval representative is an experienced application engineer. Consult him on your pumping problems or write today for literature.

DE LAVAL IMO PUMPS
capacities to 750 gpm
pressures to 1500 psig





DE LAVAL CPO PUMPS
capacities to 2000 gpm
heads to 200 feet

DE LAVAL *Pumps*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

DL 236

CALENDAR
OF MEETINGS

ch 8-12, National Electrical Manufacturers sociation: Mid-winter meeting, Edgewater ach hotel, Chicago. Association address: 5 E. 44th St., New York 17. Managing rector: W. J. Donald.

ch 9-12, American Management Associa-n: General management conference, Fair-ont hotel, San Francisco. Association ad-ress: 330 W. 42nd St., New York 36. Vice resident-secretary: James O. Rice.

ch 10-12, Society of the Plastics Industry c.: Pacific coast section conference, Hotel l Coronado, Coronado, Calif. Society ad-ress: 67 W. 44th St., New York 36. Execu-ve vice president: William T. Cruse.

ch 10-12, American Society of Mechanical ngineers: International meeting, Hotel Del rado, Mexico City, D. F. Society address: W. 39th St., New York. Secretary: C. E. avies.

rch 15-17, National Association of Waste laterial Dealers Inc.: Annual meeting, Ho-l Waldorf-Astoria, New York. Association ddress: 271 Madison Ave., New York 16. Managing director: Clinton M. White.

rch 15-19, National Association of Corrosion ngineers: Annual conference and exhibit, Municipal Auditorium, Kansas City, Mo. As-ociation address: 1061 M & M Bldg., Hous-on 2. Executive secretary: A. B. Campbell.

rch 15-19, National Association of Manu-acturers: Institute on Industrial Relations, Hollywood Beach hotel, Hollywood, Fla. As-ociation address: 14 W. 49th St., New York 20. Director, Employee Relations Di-vision: Sybl S. Patterson.

rch 16-17, Engineering Institute on Indus-rial Ventilation: University of Wisconsin, Madison 6, Wis. Information: Professor Ray D. Tegtmeyer, Stadium Offices, University of Wisconsin, Madison 6, Wis.

arch 16-17, Steel Founders' Society of Amer-ca: Annual meeting, Edgewater Beach otel, Chicago. Society address: 920 Mid-land Bldg., Cleveland 15. Executive vice president: F. Kermit Donaldson.

arch 17-19, Pressed Metal Institute: Spring technical meeting, Hotel Carter, Cleveland. Institute address: 2860 E. 130th St., Cleve-land. Managing director: O. B. Werntz.

arch 18-19, American Management Associa-tion: Special conference on employee group benefits, Hotel Roosevelt, New York. As-sociation address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

arch 19-20, Machinery & Allied Products Institute: Fourth session, seventh confer-ence on capital goods economics, Greenbrier hotel, White Sulphur Springs, W. Va. In-formation: Secretary, Charles W. Stewart, 1200 18th St. NW, Washington 6.

arch 21-23, Controllers Institute of America: Eastern spring conference, Sheraton Park hotel, Washington. Institute address: 1 E. 42nd St., New York 17. Director of public relations: G. K. Dahl.

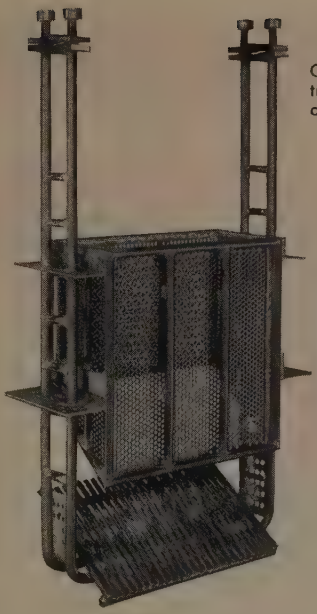
arch 21-24, Copper and Brass Warehouse As-sociation Inc.: 3rd Annual meeting, Hotel Greenbrier, White Sulphur Springs, W. Va. Association address: 1420 New York Ave. NW, Washington 5. Executive secretary: George W. Proffitt.

March 24-26, American Power Conference: Annual meeting, Hotel Sherman, Chicago. Information: Edwin R. Whitehead, con-ference secretary, Illinois Institute of Tech-nology, Technology Center, Chicago 16.

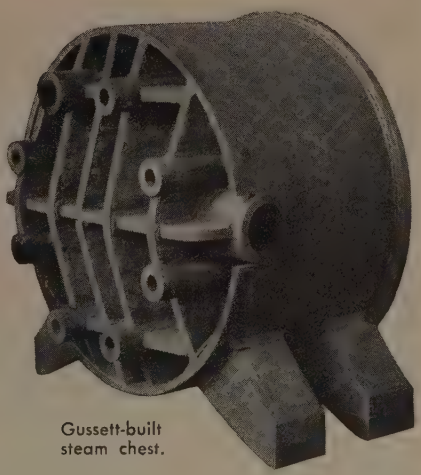
March 25, National Industrial Conference Board Inc.: General session for all asso-ciates, Ambassador hotel, Los Angeles. Board address: 247 Park Ave., New York 17. Sec-retary: Herbert S. Briggs.

March 25-27, American Hot Dip Galvanizers Association Inc.: Annual meeting, Hotel Netherland Plaza, Cincinnati. Association address: 1506 First National Bank Bldg., Pittsburgh 22. Secretary: Stuart J. Swens-son.

March 29-31, Society of Automotive Engineers Inc.: National production meeting and forum, Drake hotel, Chicago. Society ad-dress: 29 W. 39th St., New York 18. Sec-retary and general manager: John A. C. Warner.



Gussett-built salt bath heat treating basket made of Inconel.



Gussett-built steam chest.

YOU CAN TRUST YOUR TOUGH STEEL & ALLOY PLATE FABRICATING JOBS TO GUSSETT

In forty years of fabricating equipment for all segments of industry, Gussett has learned much about the requirements of all types of service.

With one of the most modern and complete fabricating plants backed by comprehensive engineering service, Gussett can put this "know-how" to work to handle your fabricating jobs efficiently, economically, promptly and to your full satisfaction, whether a single item or multiple duplicate units. The tougher the problem, the better we like it.

Your design prints, description or service requirement data is all we need to quote and put the job in production. If you desire, we'll send a representative fully qualified to help you work out the details involved. *May we figure on your next job?*

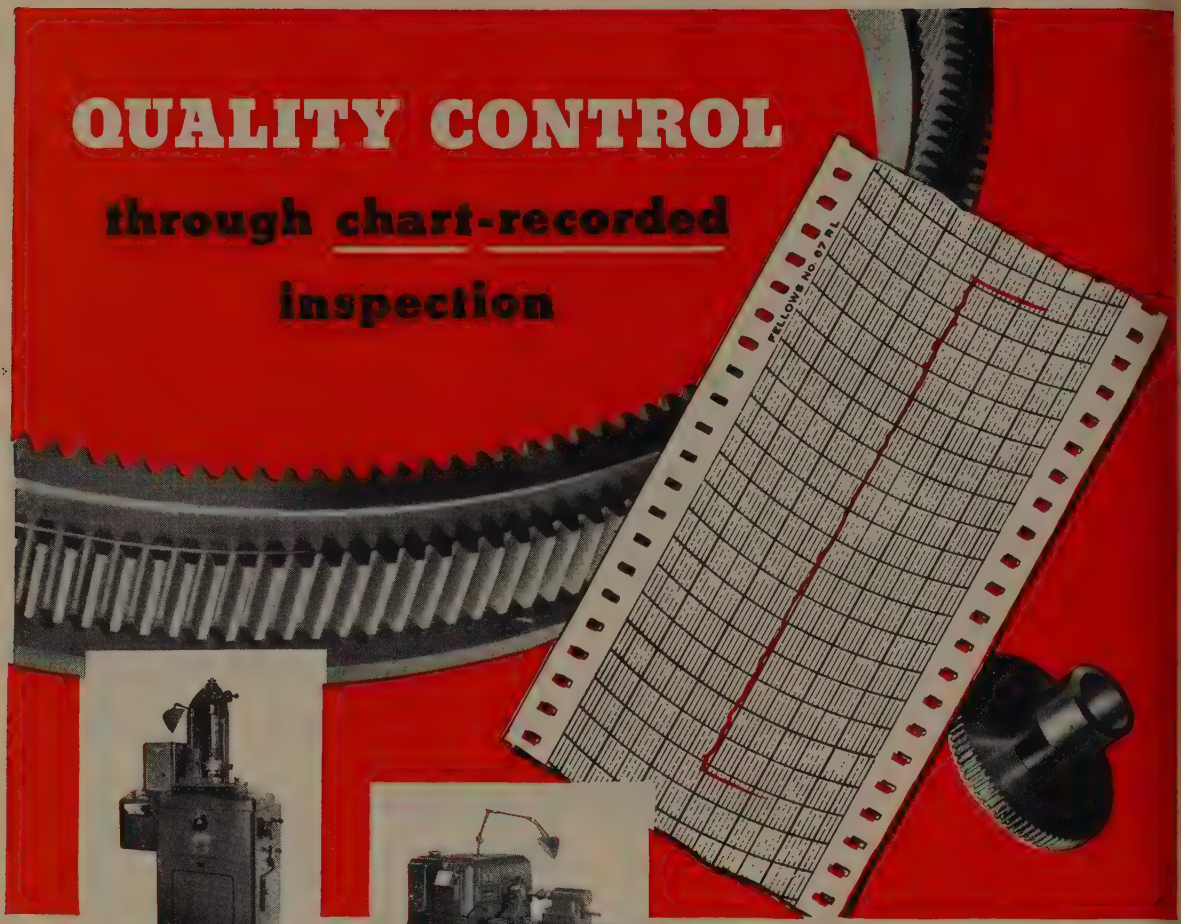
WRITE FOR THIS FILE BULLETIN with a complete listing of Gussett facilities and capabilities. You'll find it helpful in planning your fabricating jobs.

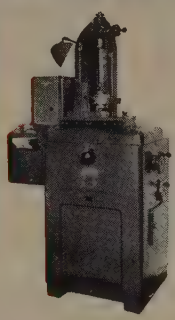
GUSSETT
BOILER & WELDING, INC.
1545 WHIPPLE RD. S. W.
CANTON 10, OHIO

PLAIN OR LINED TANKS • PRESSURE VESSELS • HOPPERS • VULCANIZERS
GENERAL STEEL AND ALLOY PLATE FABRICATION • BINS • STACKS
LARGE DIAMETER PIPE • WELDMENTS • MACHINE BASES AND FRAMES

QUALITY CONTROL

through chart-recorded inspection



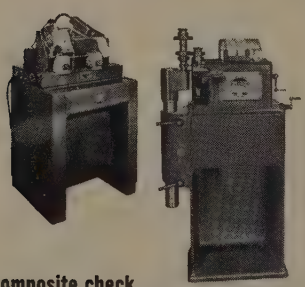


For checking involute profiles

—Fellows 12 and 24-inch Involute Measuring Instruments with electrical recorders chart the readings at 500 to 1 magnification.

For checking lead

—Fellows Lead Measuring Instruments of like capacity chart errors with reference to a straight line at 500 to 1 magnification. Also for checking crown and taper. No involved calculations required.



For composite check

—Fellows Red Liners, three models, record all gear errors in combination on a chart as the precision master gear rotates in intimate contact with the gear being checked.

You can rely on Fellows Inspection Instruments to resolve gear errors before costly assembly and to accurately chart a permanent record of your gear inspection. It gives visual proof of gear 'quality' beyond argument.

Your Fellows Representative will be glad to give you a quick review of the complete line of Inspection Instruments. Literature is available from the nearest Fellows office.

THE Fellows GEAR SHAPER COMPANY

Head Office and Export Department: 78 River Street, Springfield, Vermont.

Branch Offices: 319 Fisher Bldg., Detroit 2 • 5835 West North Ave., Chicago 39 • 2206 Empire State Bldg., New York 1

Production facts you should know about ALCOA® Aluminum Forgings

Improved equipment and production techniques mean aluminum forgings now compete with other metals and fabricating processes

In the period between 1946 and 1949, production of aluminum forgings increased over 100 per cent at Alcoa alone. With the addition of the large 15,000-ton hydraulic press in the Cleveland Works, along with other equipment since put into operation, production has increased still further. These improved facilities mean higher output of better quality aluminum forgings at a cost that makes them competitive with other metals and other fabricating processes.

What about the future? We suspect you have already heard of the giant 35,000 and 50,000-ton presses now being constructed for our Cleveland Works—expected to be in operation this year—and are aware of the tremendous new design possibilities facilities such as these will provide.

Parts will be still bigger, will have thinner web sections, less draft, closer tolerances, better dimensional stability, to say nothing of being more complicated.

What's more, an ever-increasing share of the aluminum forging output from now on will be commercial, not military. In short, automotive, electrical appliance, tool, and engine designers, in fact, designers in all of industry—taking hints from the military—are turning to aluminum forgings for better, stronger, lighter, yet lower cost parts.

A glance through the next few pages will show you reasons why.

View of 15,000-ton hydraulic forging press operated by Alcoa's Cleveland Works. Not only has this press contributed to research on still heavier presses, it has permitted significant design improvements by way of reducing "small pieces" construction.

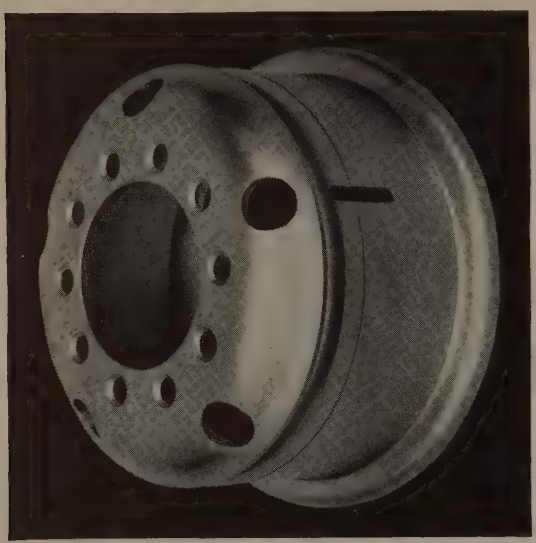
These people use ALCOA Aluminum Forgings

Aluminum forgings possess all the inherent characteristics of aluminum, such as light weight, corrosion resistance, and good machinability; and combine with these advantages great strength, comparable to that of structural steel.

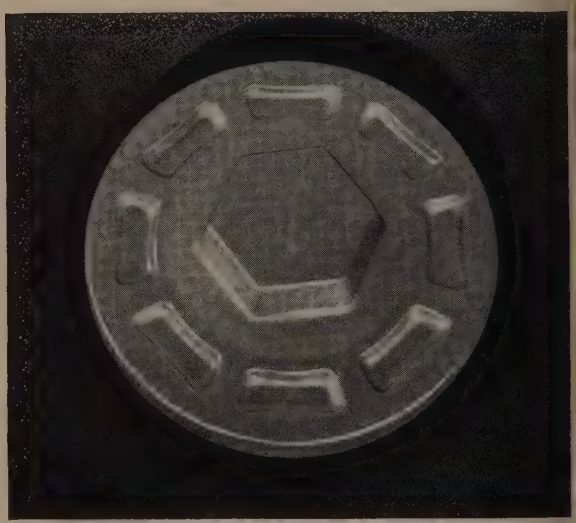
The result: high strength-weight ratios—excellent for such applications as aircraft, truck and bus where range, speed and payload depend on light body weight, yet sufficient strength to support that load.

Weighing about one-third less than structural steel, aluminum forgings help reduce operator fatigue when they are used in parts frequently carried, lifted or handled. Hand power tools are a good example. With their lower elastic modulus, aluminum forgings have several times the impact-absorbing capacity of mild steel.

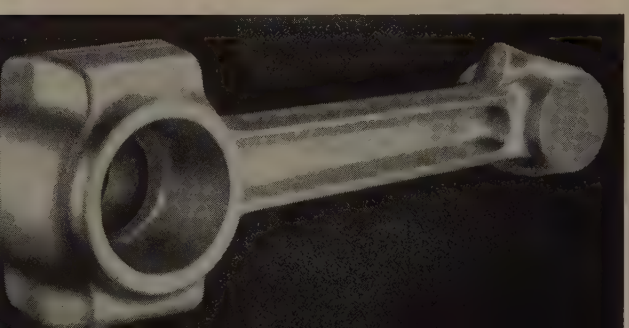
Other features make aluminum forgings stand out. For example, they are easily machined, often at speeds of 1000 fpm. But, their smooth, bright surfaces often make subsequent machining unnecessary. What's more, inspection costs are less. Part dimensions are uniform, keeping scrap loss to a minimum.



FORGED WHEELS—Weighing 48 pounds, 40 less than its steel counterpart, this Alcoa Forged Aluminum Disc Wheel for trucks and buses is proving its superiority by reducing unsprung weight, allowing larger payloads. Machined from an aluminum forging, these wheels literally are rounder which means less vibration, less maintenance.



CUTTER DISK—An Alcoa Forged Cutter Disk to be used on a concrete surfacing machine. Because of their great strength, Alcoa Forgings are perfect for highly stressed moving parts. Further, their light weight means less driving horsepower. Sturdy, these forgings can stand severe abuse in emergencies, provide dependable service under normal load, all with less maintenance.

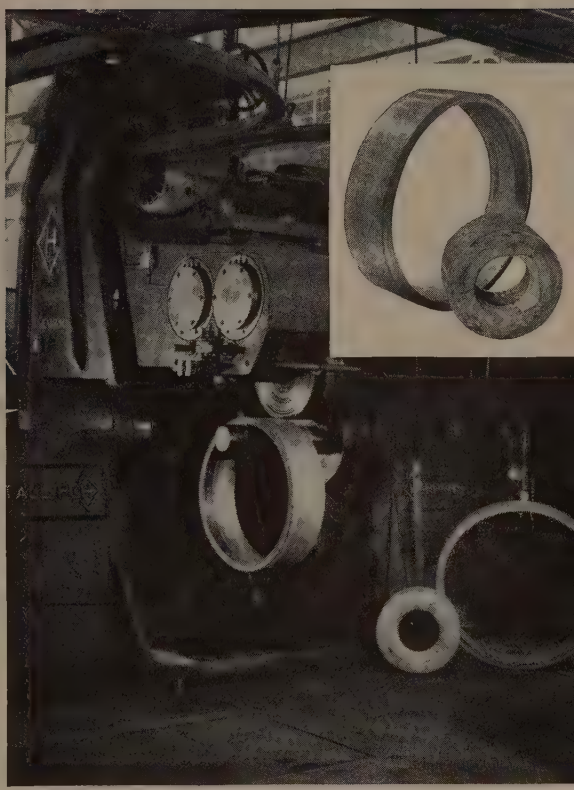


CONNECTING RODS—Forged aluminum connecting rods not only are strong, but, being light, more of the horsepower developed by the engine can be directed toward driving the outside load rather than the engine's own parts. Alcoa Forged Pistons are in use today in diesel engines driving trucks, buses and railroad locomotives.

what about cost?

Cost of the piece as it comes from the forging press is only half of the aluminum forging cost story. To keep this half low, Alcoa is constantly adding new equipment and improving the old. For example, the largest facilities in the world for sinking aluminum dies will soon be in operation at the Cleveland Works. Also, a new machine for roll forming aluminum rings in sizes up to 40 inches O.D. and 20 inches wide has been added. The ring roller, as it is called, is capable of turning out rings to closer tolerances, with better surface finishes than any previous methods. Then, of course, there's the 15,000-ton press. These new facilities spell more faithful reproduction of design, fewer rejections, faster inspection, once, lower as-forged costs.

The other half of the cost picture concerns cost per finished piece. As forgings, shapes can be made more complete when they come from the press. The result: design can be greatly simplified, improving quality, and keeping subsequent machining, assembling, and finishing operations to a minimum. So, if you have hesitated to make your product an aluminum forging because of cost, take another, longer look . . . today.



New ring roller now in production at Alcoa's Cleveland Works. This machine is capable of producing rings up to 40 inches O.D. and 20 inches wide with closer tolerances, better surface finish, and at lower cost than previous methods.

Secondary operations easily performed

Perhaps by now you have already had experience with Alcoa Forgings and have found out for yourself how easily and quickly secondary operations can be performed on them. And your experience would not be unique. They can be machined at high feeds and speeds, drilled, reamed, threaded, and tapped—all accurately—at rates that defy comparison.

There are a few rules of thumb that are good to follow when tackling these operations. For example, because of aluminum's low elastic modulus, it will "flex" or "spring" about three times as far as steel under a given load. To maintain close tolerances, then, it is important that the work be securely clamped before attempting subsequent machining.

Because aluminum will expand or contract more with changes in temperature, an effort should be made to minimize temperature variations of the piece, often caused by using dull tools or improper coolants.

Since each alloy is different, machinability of each must be considered. Alloy 11S is the free-machining alloy. Alloys 14S, 25S and 18S also offer excellent machinability.

Speeds for drilling Alcoa Forgings with high-speed drills can vary up to 600 peripheral feet per minute. For threading, hand and machine taps of the ground thread type will produce smooth, accurate threads when they have flutes undercut to provide a top rake of 10 to 20° at the leading edges. Excellent threads can be chased on an engine lathe even in the softest aluminum by using a single-pointed threading tool. If sawing is necessary, circular saw blades for aluminum may be operated satisfactorily at peripheral speeds ranging from 5,000 to 15,000 feet per minute.

Finishes for Alcoa Forgings

Frequently, surface finishes on Alcoa Forgings are satisfactory as fabricated. But, to enhance appearance or to add a protective coating, it is often desirable to perform subsequent finishing operations—mechanical, chemical, or electrochemical. Alcoa Forgings lend themselves to all of these.

Among the mechanical finishing operations are: grinding, polishing, buffing or coloring, sometimes referred to as color buffing. Follow these rules of thumb: Always have the working surface as clean as possible and, too, when polishing, try to follow the direction of metal flow.

Chemical finishes such as frosted, diffuse reflector, etching, and Alrok®, provide decorative coatings that resist corrosion but are not particularly abrasion resistant. Often, they precede electrochemical or Alumilite* finishes. These provide a harder oxide coating than that which normally forms on aluminum. Alumilite finishes offer excellent protection against weather or chemical attack. And, because the coating is basically hard, it has a substantial resistance to wear and rubbing abrasion not possible with plain chemical finishes.

Too, Alcoa Forgings can be enameled, lithographed, or lacquered, whether for protection, eye appeal, or to emphasize an important sales message.

Remember, each Alcoa Alloy reacts differently with respect to holding a paint, but all are easier to protect with paint than most other metals if surfaces are properly prepared. Easiest and quickest way to do this is by solvent cleaning, or by roughening surfaces with sandblasting or scratchbrushing.

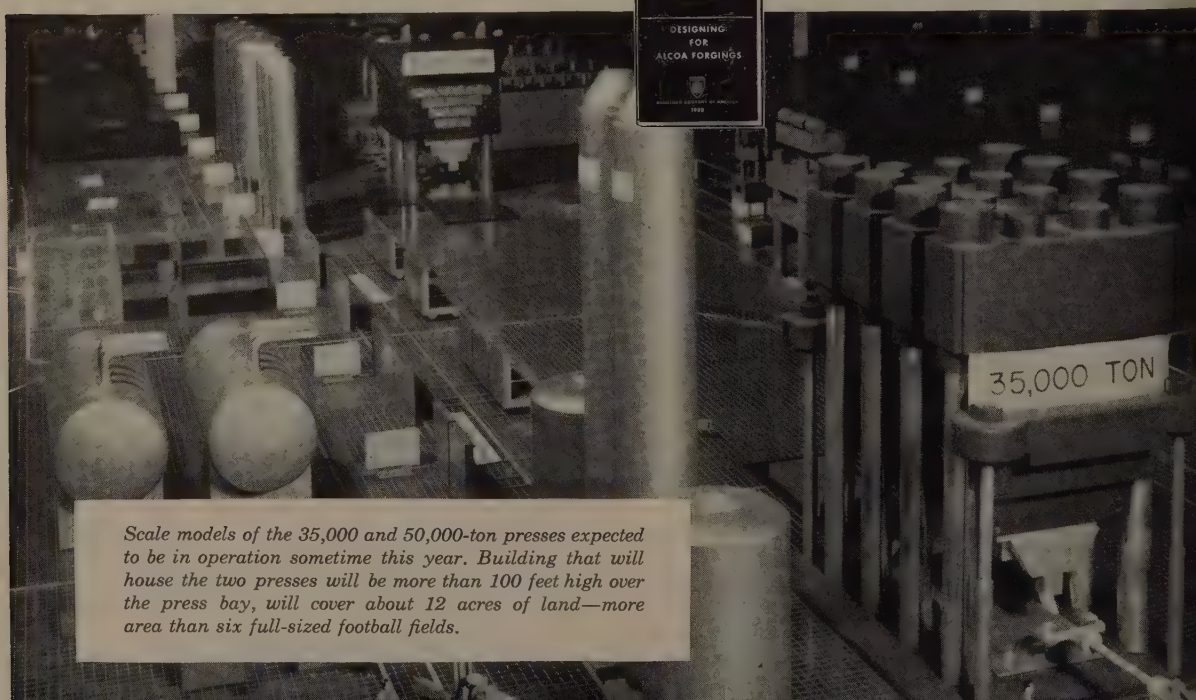
*Trade Name of ALUMINUM COMPANY OF AMERICA

Want more information?

There just isn't space here to cover all the details you want to know about Alcoa Forgings. Should you desire more information about design, machining, or finishing, write on your company letterhead, telling us your job function, to ALUMINUM COMPANY OF AMERICA, 1994-C Alcoa Building, Pittsburgh 19, Penna. We'll be glad to send you the fact-filled book, *Designing for Alcoa Forgings*, a book you and your designers can put to good use now. Or, for more about finishes, ask for your copy of the book, *Finishes for Alcoa Aluminum*.

If you have an aluminum forging problem that needs immediate attention now, contact your local Alcoa sales engineer. His office is listed under "Aluminum" in the classified section of your telephone directory. Whether you plan on buying Alcoa Forgings today or a year from today, don't hesitate to use his time and talents freely. That's his job.

ALCOA ON TV brings the world to your armchair with "SEE IT NOW" featuring Edward R. Murrow, Tuesday evenings on most CBS-TV stations.



Scale models of the 35,000 and 50,000-ton presses expected to be in operation sometime this year. Building that will house the two presses will be more than 100 feet high over the press bay, will cover about 12 acres of land—more area than six full-sized football fields.

P&H OVERHEAD CRANES

P&H Magnetorque® (AC crane control)

. . . Outstandingly Successful in more than 900 Installations

Right from the start, P&H Magnetorque was hailed as one of the most important crane developments in 25 years. And so it has proved to be! Since it was introduced in 1947, more than 900 Magnetorque installations have been put on P&H Cranes. *And every single one is successful!*

Magnetorque AC Crane Control, developed and perfected by P&H, gives you the finest control ever devised with the economy and convenience of AC power. It gives you better performance — *proved performance!* And far lower maintenance costs. Remember, P&H electrical equipment is *designed and built* for crane service — *not adapted for it!*

If plant expansion or modernization is in your program, review your crane problems with P&H at the earliest planning stages.

P&H OVERHEAD CRANE DIVISION

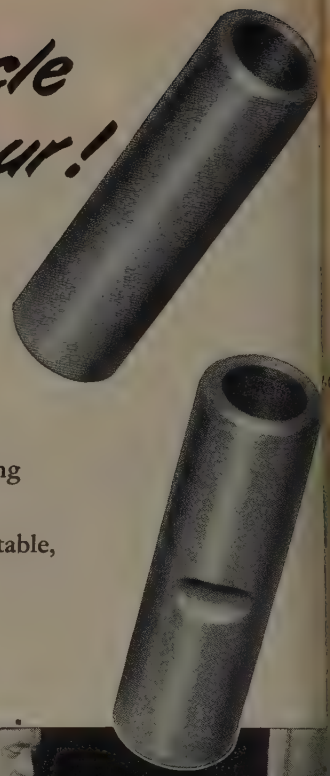
HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

Just off the press — a new 24-page bulletin on Industrial Cranes. Ask for Bulletin C6-3.

the P&H Line

Continuous, Automatic Cycle produces 1150 parts per hour!



TYPICAL EXAMPLE OF HIGH PRODUCTION ENGINEERED THE *American* WAY

To broach radius notches in automotive piston pins, American engineers designed a *completely automatic* two station fixture featuring *continuous cycling.* Each station broaches two parts. Installed on an American T-4-24 Broaching Machine, equipped with a special work table, this fixture permits broaching four parts simultaneously . . . produces more than 1150 parts per hour.

SIX AUTOMATIC OPERATIONS ENGINEERED IN CONTINUOUS CYCLE FIXTURE

The operator has only to keep the gravity-type loading hopper filled with parts. A transfer pusher pushes two parts at each station into position where they are hydraulically clamped in V nests. The main slide starts down broaching the four parts simultaneously. At the end of the stroke the transfer pushers push the part into a chute in the center of the machine where they are ejected. The transfer pushers and broaches return to the starting position and the cycle repeats. All operations are electrically interlocked.

SOLVE YOUR BROACHING PROBLEMS THE *American* WAY

Continuous, automatic cycling is only one way that American engineers help manufacturers get high production. Perhaps an American-engineered installation will increase production in your plant. To get American's recommendations send a part print or sample and hourly requirements.

AMERICAN

American BROACH & MACHINE CO.

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

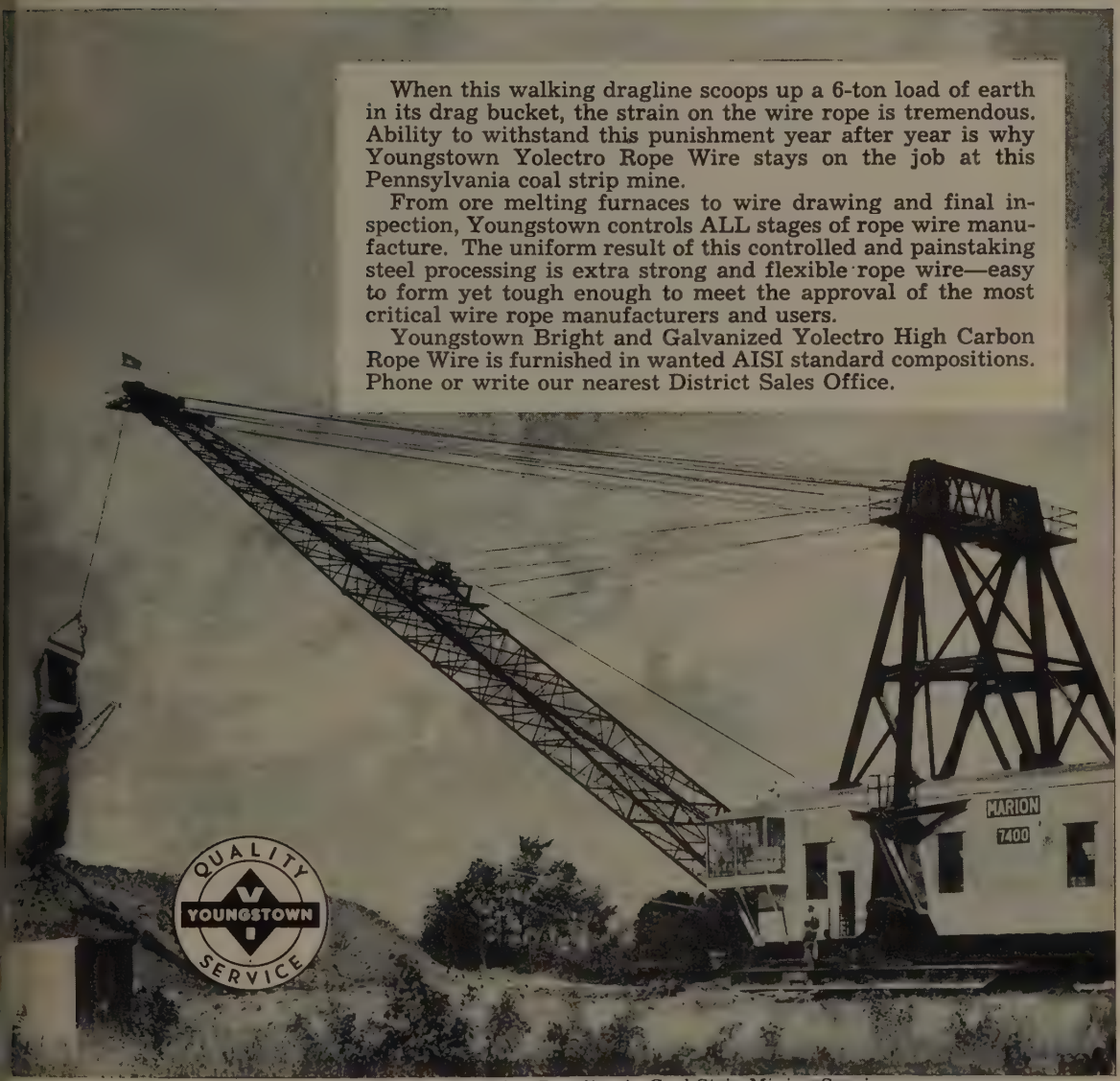
SUNDSTRAND

Wire Rope From Youngstown Yolectro Rope Wire Proves Extra Strong in Service

When this walking dragline scoops up a 6-ton load of earth in its drag bucket, the strain on the wire rope is tremendous. Ability to withstand this punishment year after year is why Youngstown Yolectro Rope Wire stays on the job at this Pennsylvania coal strip mine.

From ore melting furnaces to wire drawing and final inspection, Youngstown controls ALL stages of rope wire manufacture. The uniform result of this controlled and painstaking steel processing is extra strong and flexible rope wire—easy to form yet tough enough to meet the approval of the most critical wire rope manufacturers and users.

Youngstown Bright and Galvanized Yolectro High Carbon Rope Wire is furnished in wanted AISI standard compositions. Phone or write our nearest District Sales Office.



Electric Walking Dragline in Coal Strip Mining Service
at Buckeye Coal Co., Grove City, Pa.

Youngstown YOLECTRO HIGH CARBON ROPE WIRE

THE YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon, Alloy and Yoloy Steel

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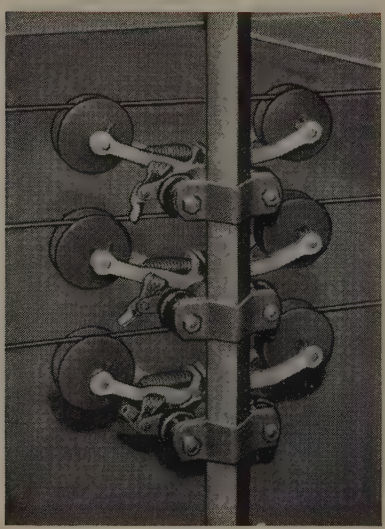
GRAPHITAR®

current collector wheels for overhead electric cranes

GRAPHITAR current collector wheels increase operating efficiency, reduce maintenance costs and give longer service in this difficult application



Excellent conductors of electricity, GRAPHITAR (carbon-graphite) collector wheels for overhead electric cranes provide numerous advantages over ordinary metal wheels. GRAPHITAR is self-lubricating, making bushings unnecessary and completely eliminating the need for greasing. GRAPHITAR minimizes pitting, arcing and burning, thus putting an end to dead spots in the line that reduce operating efficiency. GRAPHITAR wears exceptionally well and will give longer service than ordinary metal wheels. GRAPHITAR is chemically inert and will not be affected by fumes, heat, cold, rain or snow. For complete information, write us today

OUR 100th YEAR

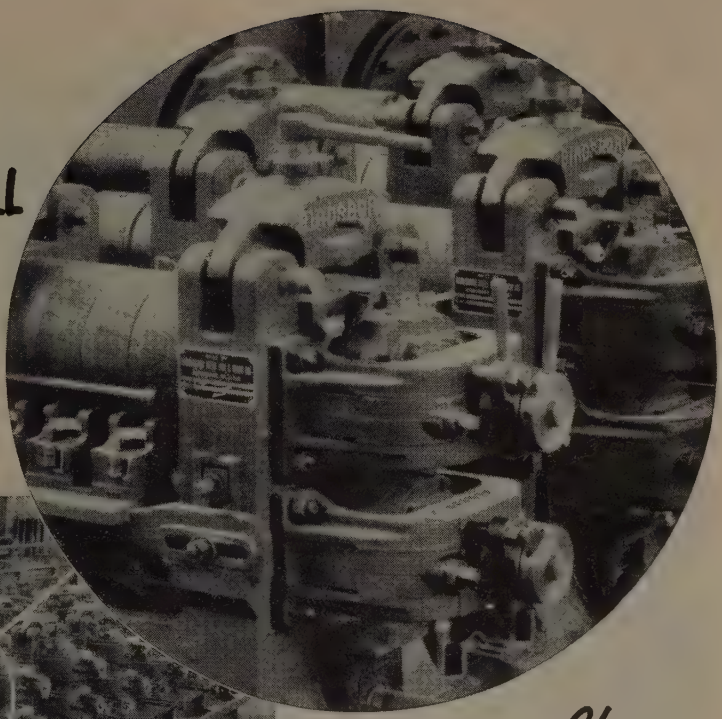
184

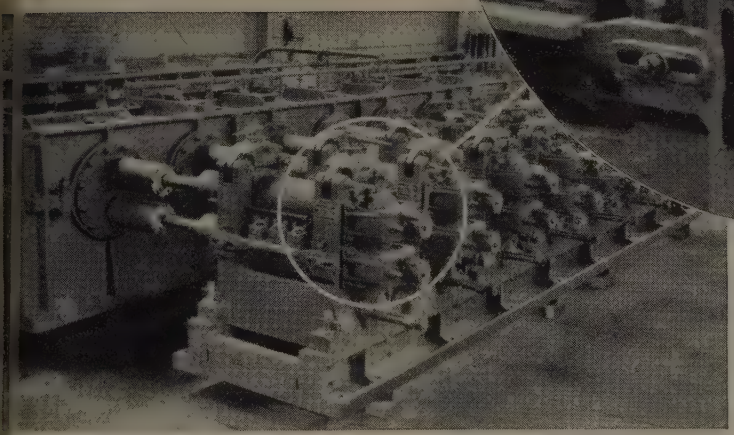
THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

OLLER-BEARING END ROLL

Reduces Downtime





Steps Up Production

d roll adjustment patent applied for.

● The greatest improvement in end roll mechanism made in years . . . permits more accurate and faster end roll adjustment; more flexible operation and minimum maintenance.

The roller bearing is locked to the end of the roll, but may be changed in a jiffy—need not be removed for dressing or until the roll is scrapped. When rolls need changing, patented tilting caps swing up and rolls are raised through top of housing without disassembling end roll adjustment.*

Heavy C clamps secure the bearing housing to the frame with self-aligning surface contact for easy vertical adjustment without wear of clamping surface.

This advanced design typifies the Skill and experience of Birdsboro engineers. We'll be glad to apply our engineering service to your mill machinery problems anytime you say the word.

MM-20-51-R

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STEEL FOUNDRY & MACHINE CO.

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Birdsboro, Pa.
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Brighten your rough grinding picture with this profit-boosting

"TOUCH of GOLD"

FOR YOUR SWING FRAME GRINDING, Norton wheels take heavy pressures and high speeds in stride. Their fast, clean-cutting action and extra long life assure more metal through your cleaning room per man-hour.

Profits from grinding actually begi with the first, most basic grinding opera tion — snagging. Yet the profit-potential of rough grinding are apt to be mor neglected than any other.

In your own rough grinding, Norto wheels can help bring every job up to it proper money-making level. Because yo can get Norton wheels that are exactl right — in abrasive, in bond and in ever other detail — for best results on all you jobs.

For proof, test Norton wheels against any others, under the same conditions Your operators will like their easy-han dling, clean-cutting action. And *you'll* lik the way they grind off more metal pe dollar, turn out better work and increas your production — bringing the real

FOR YOUR BENCH AND FLOOR STAND GRINDING, Norton wheels combine exceptional cutting qualities with consistent wheel economy in a way that makes your grinding look good and your costs look better.

FOR MANY OTHER GRINDING JOBS, use Norton Nylon-Reinforced Hub Wheels — BD rigid and BFR semi-flexible. For work ranging from notching risers to weld finishing, they're the lightest, easiest, safest wheels made.

p t-boosting "Touch of Gold" to your
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Your Norton Distributor
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Making better products...
to make other products better

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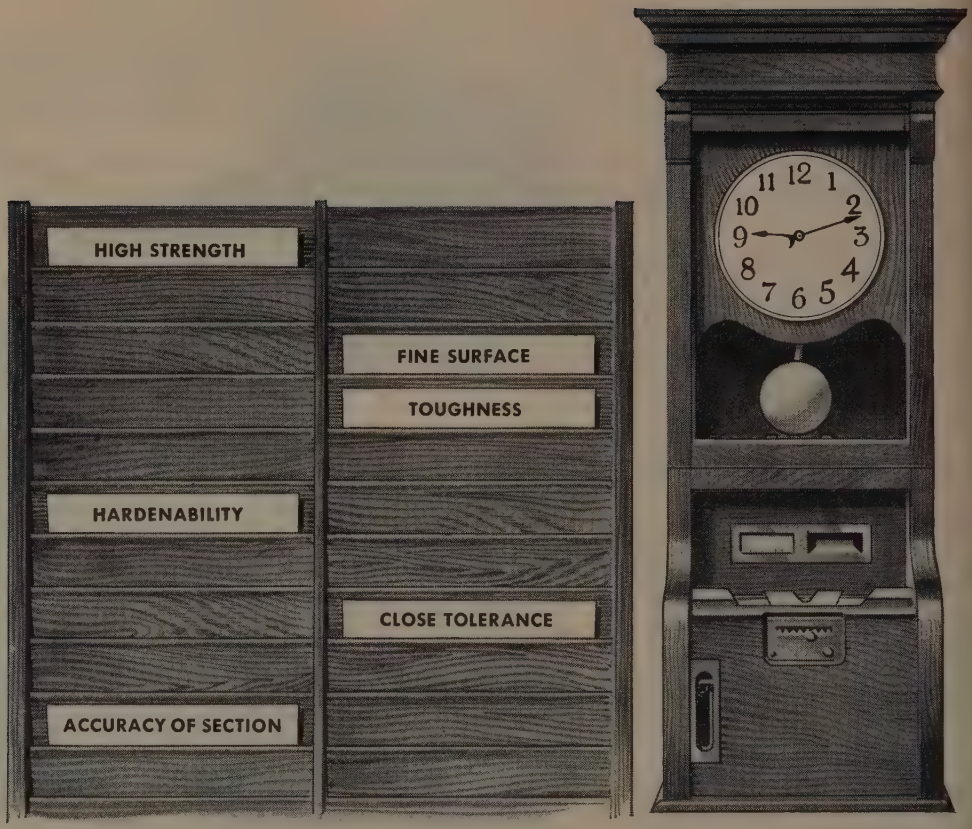
FOR YOUR PORTABLE GRINDING, Norton wheels have the inbuilt balance that reduces vibration and bounce, and makes them "hug that work." Results are faster grinding, longer wheel life, less operator fatigue — advantages that show up in your profit column. Use Norton ALUNDUM* abrasive on steels and steel alloys, CRYSTOLON* abrasive on gray iron and non-ferrous metals.



It's time to put these to work in your steel parts

They're the qualities you find in Republic Cold Drawn Alloy Steel Bars

● Your high speed automatics take full advantage of the cost-cutting qualities.

Your designers can make full use of the high strength and uniform structure.

Your production men can get the ideal combination of wearability and strength from the uniform hardenability and toughness of alloy steel.

You get all these properties PLUS uniform machinability.

It all adds up to a lot of answers to tough cost and production problems. And Republic's 3-D Metallurgical Service stands ready with its field, mill and laboratory metallurgists to help you get the best out of Republic Cold Drawn Alloy Bars.

All it takes is a phone call to your nearest Republic office. It doesn't cost a thing. And it might save you a lot.

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REPUBLIC COLD DRAWN ALLOY STEEL BARS

WHETHER YOU ARE REAMING FOR SIZE or finish **and** size; whether your reaming requirements are for a few holes or thousands, you'll find GTD AMPCO reamers up there among the best. And there is a GTD AMPCO field engineer at your service in most industrial centers. If you have reaming problems call any Greenfield sales office.

AMPCO TWIST DRILL DIVISION

GREENFIELD TAP and DIE CORPORATION

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NEW YORK CHICAGO DETROIT LOS ANGELES

Announcing the

1954 redesign contest for Gray Iron castings

1st prize $500.00
2nd prize $250.00
3rd prize $100.00

Here's your opportunity to cash in *twice* on the products or parts you have redesigned for production in Gray Iron.

First: because the unique characteristics and castability of Gray Iron helped you replace a competitive material . . . more economically and more efficiently.

Second: enter your redesign project in the Fifth Annual Gray Iron Founders' Society's *Redesign Contest* and win one of the substantial cash awards.

Here's all you have to do . . .

1. Select the best example of products or parts that you have redesigned for Gray Iron casting.

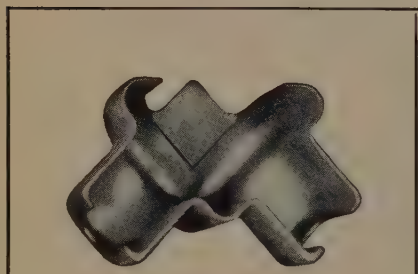
2. Give the facts for this switch to Gray Iron . . . how much you saved in labor and material costs . . . how much efficiency you gained and any other factors that led you to this decision.

3. Submit an 8″ x 10″ glossy photo of the Gray Iron casting with your entry. And, if possible, submit a similar photo of the original product or component.

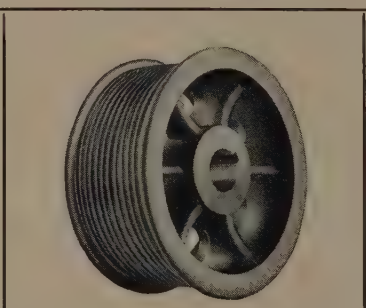
4. Get your entry in by JUNE 1, 1954 . . . closing date for contest. Address: *Redesign Contest*, Gray Iron Founders' Society, Inc., National City E. 6th Bldg., Cleveland 14, Ohio.

5. Contest is open to all persons engaged in the metal-working trades . . . entries may be entered jointly by two or more individuals.

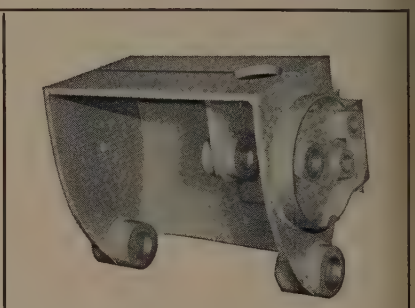
Examples of previous award winners . . . featured in the Society's recent National Trade Advertising



Production costs were cut 90% by redesigning this gear cover in Gray Iron to replace the original fabricated cover.

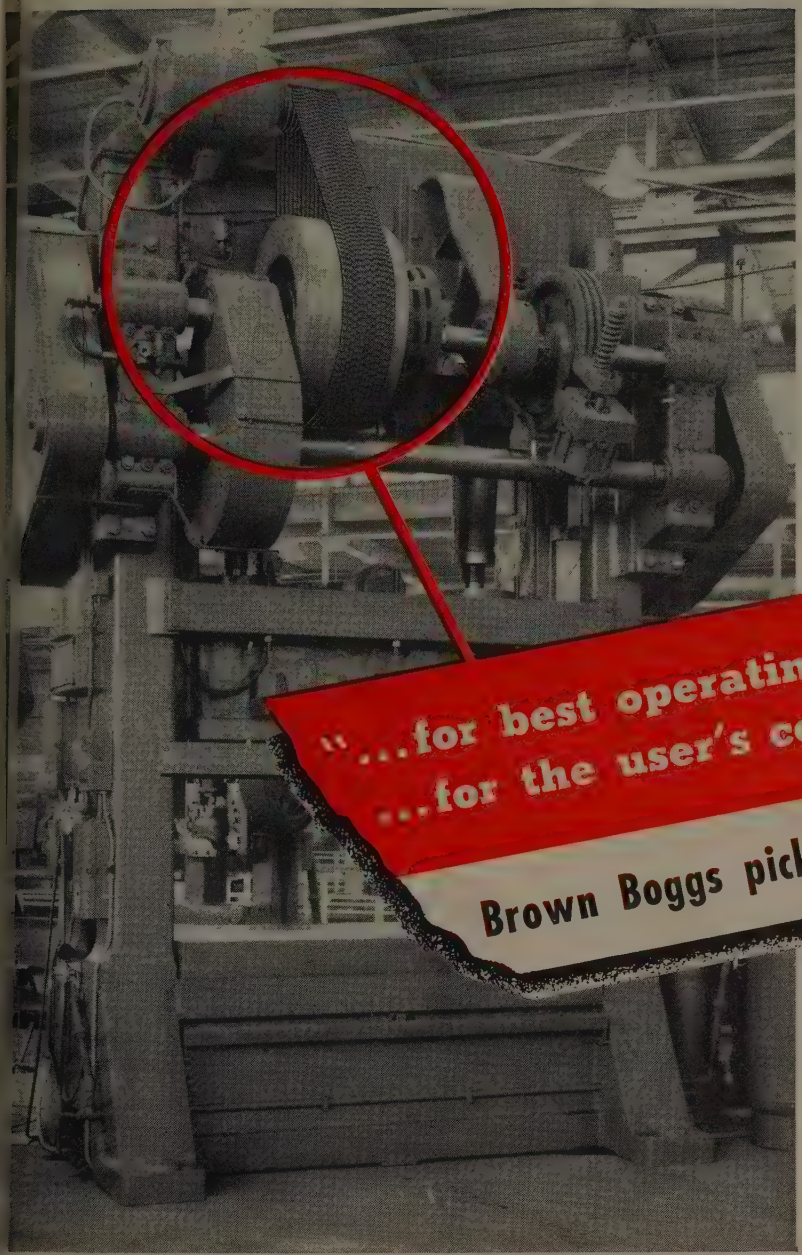


This cable drum was redesigned for production in Gray Iron with a cost saving of 41% per unit.



By redesigning this gearbox in Gray Iron, 45% was saved on original cost of fabricated gearbox . . . 41% on machine and labor costs.

GRAY IRON FOUNDERS' SOCIETY, INC.
NATIONAL CITY-E 6th BLDG. CLEVELAND 14, OHIO



"...for best operating condition ...for the user's convenience"*

Brown Boggs picked Veelos v-belt

The Brown Boggs Foundry & Machine Company, Ltd., of Hamilton, Canada, who manufactures this 200-ton Press, thoroughly checked all types of v-belt. They wanted a v-belt that would give efficient, vibrationless, full power delivery. They wanted a v-belt that could be installed quickly and easily. Only Veelos met *both* requirements. And here's what Brown Boggs says about their selection of Veelos . . .

***"We feel that our own factory assembly has put this Press in the best operating condition. To eliminate the necessity for dismantling any part of the equipment, and for the user's convenience in changing belts, we have equipped the drive with Veelos V-Belting."*

Brown Boggs selected Veelos even though it cost more than ordinary v-belt. They know, however, that "what's best for their customer, is best for their business!" It will pay you to equip your machines with Veelos v-belt. Once you've done that you'll be an enthusiastic Veelos user, too.

Veelos is known as Veelink in Canada and foreign countries.

VEELOS
THE LINK
V-BELT

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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

COLUMBIUM and TANTALUM

Strategic Combination for Imparting Strength and Stability to High-Temperature Metals

Gas turbines for jet-aircraft engines, and for other similar engines being developed for marine and railway transportation, have greatly increased the demand for high-temperature metals. The present most satisfactory metals are either iron-base, nickel-base, or cobalt-base. They are used in the form of castings and hot-worked products, such as forgings, bars, and sheets.

Many of these special metals contain columbium because of its beneficial effect on high-temperature strength in both cast and wrought products. Investigations have shown that columbium is one of the key alloys for imparting high-temperature strength and stability in metals suitable for operating temperatures up to 1500 deg. F. and above.

Need for New Alloy

Originally, a ferrocolumbium alloy containing approximately 55 per cent columbium and 5 per cent tantalum was employed in the production of many of these high-temperature metals. However, with the increased use of high-temperature metals and columbium-bearing 18-8 stainless steels, it became necessary to utilize the tantalum-rich columbium ores.

ELECTROMET's Research Laboratories investigated whether an alloy containing more tantalum and less columbium would be equally satisfactory for producing the high-temperature metals. Columbium and tantalum alone, as well as combination alloys of columbium plus tantalum, were tested.

Results of Tests

The alloy N-155 was selected for tests. It is an iron-base alloy with the following approximate analysis:

Chromium	20 per cent
Nickel	20 per cent
Cobalt	20 per cent
Tungsten	3 per cent
Molybdenum	2 per cent
Columbium	1 per cent
Nitrogen	0.15 per cent
Carbon	max. 0.35 per cent

The data in the table below describe the mechanical properties, at room temperature, of this low-carbon N-155 alloy modified with columbium and tantalum alone, and with combinations of columbium plus tantalum. The metal modified with columbium has good strength and high ductility at room temperature. These same good properties are obtained when tantalum, or tantalum plus columbium, is substituted for the columbium.

Stress-to-rupture tests were also conducted on these same modified low-carbon N-155 alloys at 1350 and 1500 deg. F. The data show (see table) that when the columbium is replaced with a mixture of columbium plus tantalum, the strength of the metal remains substantially unaffected at 1350 and 1500 deg. F. Also, when all of the columbium is replaced with tantalum, the strength of the metal at 1500 deg. F. is equivalent to that obtained with columbium. Hence, from the standpoint of high-temperature strength, columbium and tantalum can be used interchangeably, or in combination.

Help to Industry

ELECTROMET has developed an alloy containing approximately 20 per cent tantalum and 40 per cent columbium for use in high-temperature metals and stainless steels. It is known as ELECTROMET ferrotantalum-columbium.

Industrial experience with this alloy has confirmed the favorable results of the experimental work. The alloy has already aided considerably in augmenting the supply of columbium alloys, since it is just as effective as ELECTROMET ferrocolumbium, with 50 to 60 per cent columbium, for giving strength at high temperatures.

It should be added to a thoroughly deoxidized metal bath to obtain the best results. A recovery of about 90 per cent for the columbium and 80 per cent for the tantalum may be expected.

For further information regarding alloys for high-temperature metals, write to the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

Properties of Modified N-155 Alloys Compared*

Typical Analysis, %**	With Columbium	With Columbium and Tantalum		With Tantalum
Columbium	1.13	0.58	0.49	....
Tantalum	0.08	0.64	0.33	1.47
Carbon	0.12	0.13	0.13	0.12
Nitrogen	0.13	0.14	0.14	0.14
At Room Temperature				
Tensile Strength, psi	119,000	123,200	117,500	122,100
Yield Strength, psi	56,700	59,500	52,000	59,100
Elongation in 2 in., %	52	47	57	54
Reduction of Area, %	69	65	69	56
At 1350 deg. F.				
Stress to Cause Rupture, psi				
In 100 hr.	31,000	34,000	33,500	....
In 1000 hr.	23,000	25,000	23,000	....
At 1500 deg. F.				
Stress to Cause Rupture, psi				
In 100 hr.	20,000	20,000	20,500	20,000
In 1000 hr.	15,000	14,000	15,500	15,000

*Tests made on standard samples from one-inch round bars, water-quenched from 2250 deg. Fahrenheit.
**Composition of the base alloy is given in the text.

The term "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.

NATIONAL ACME *Announces*

a new line of single spindle automatics

for small work machined from the bar

Made in 5 sizes—½, ¾, 1⅛, 1⅝ and 2″ capacity. **LITERATURE ON REQUEST.**

As distributors in the United States for British-built **B. S. A. Single Spindle Automatic Screw Machines,** National Acme now offers proven, high production, fully-automatic single spindle machines for smaller work in this class—5 machine sizes, ½ to 2″ capacity. Thus, for the first time, you have available from one reliable source THE ONLY COMPLETE LINE of single and multiple spindle automatics covering all classes of bar machine work from the very smallest to 7¾″ diameter.

Built by B.S.A. Tools Ltd.—for 50 years a leading British builder of precision machine tools—these single spindle models feature greater convenience and safety for the operator . . . wide variety of spindle speeds with automatic speed changes . . . structural rigidity to maintain high speed precision operation . . . the latest developments in design of automatics.

Highly versatile tooling arrangements and quick changeover from job to job make the B.S.A. Single Spindle Automatic ideal for both long and short run production on small parts at lowest per-piece-cost.

The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS
1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • Limit, Motor Starter and Control Station Switches • Solenoids • Contract Manufacturing

pioneering developments keep **WHEELABRATOR®** *first in blast cleaning*

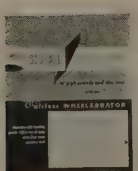
Blasting Stainless Steel Descaling Costs

new, low-cost method of descaling strip and sheet with Wheelabrator® airless blast cleaning

The cost of descaling hot-rolled steel strip and sheet has been drastically cut by mechanical descaling with airless Wheelabrator blast cleaning. At the West Leechburg plant of Allegheny Ludlum Steel Corp., stainless steel strip is descaled without scale breaking. It takes only five men to operate the Wheelabrator descaling line compared to 24 men for the batch pickling operation which it replaced. The Wheelabrator requires only 6,000 sq. ft. of floor space compared to about 10,500 sq. ft. for pickling. The loss of virgin metal has been virtually eliminated and the scale removed is in an easily recoverable condition. Reduction of acid consumption has simplified their acid disposal problem.

Steel is descaled through the controlled impact of Wheelabrator Steel Shot hurled by centrifugal force upon the steel surface to be cleaned. The constant, uniform flow of steel shot from the Wheelabrator units combined with the even, steady movement of the steel through the blast makes this mechanical cleaning method the most efficient descaling process yet devised.

Wheelabrator mechanical cleaning has been profitably applied to etching mill rolls and has effected unusual economies in cleaning strip, sheet, bar stock and skelp. Send now for complete details. Send for Bulletin 894 "How to Descale Steel Strip Mechanically" and Bulletin 914 "How to Descale Steel Sheet at High Speed and Low Cost."



Send today for Bulletin No. 894 "How to Descale Steel Strip Mechanically"

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WHEELABRATOR & EQUIPMENT CORP.
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Wheelabrator®
AIRLESS BLAST CLEANING

no charge for the hole

You wouldn't think of making a cruller and then punching out a hole to create a doughnut. But for years manufacturers have been taking solid rounds of steel and drilling out the centers to make ring-shaped or hollowed-out metal parts.

Now that wasteful practice is being eliminated. Thousands of metal working plants are using Crucible hollow bars . . . available in any of Crucible's famous tool steel grades. From Crucible warehouses conveniently located throughout the country you can get immediate delivery of KETOS oil hardening, SANDERSON water hardening, AIRDI 150 high carbon—high chromium, AIRKOOL air hardening, and NU DIE V hot work tool steels in hollow form . . . and in a wide range of O.D. and I.D. combinations.

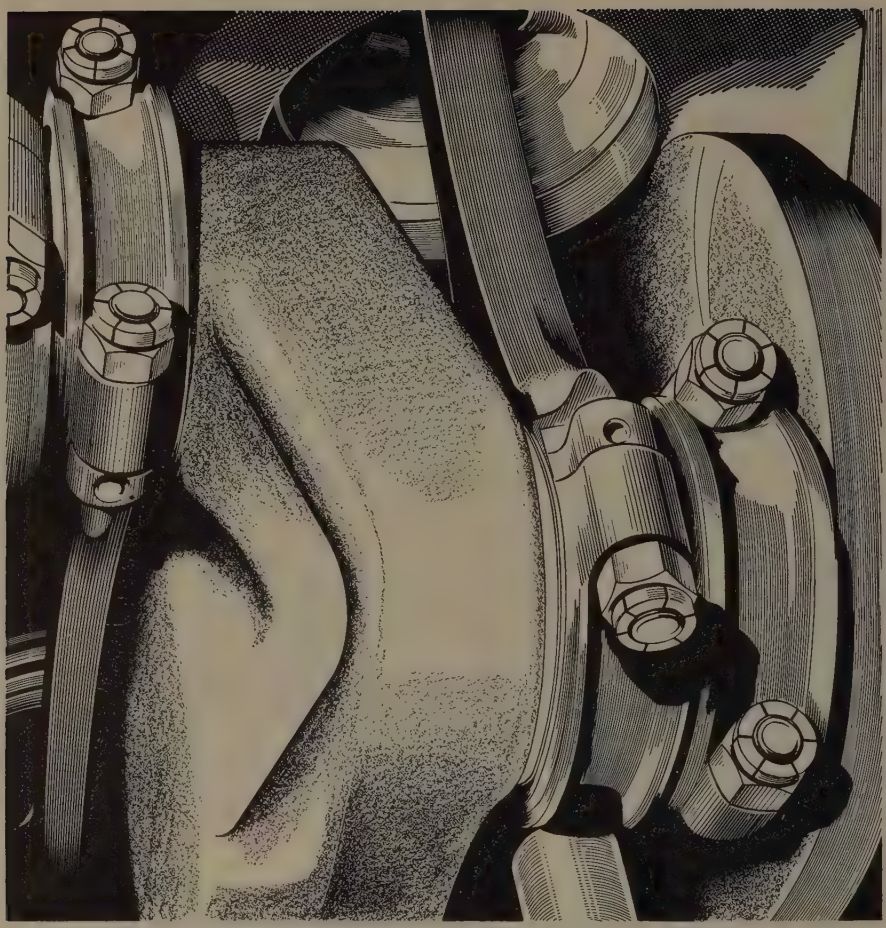
Crucible hollow tool steel bars are supplied machine finished inside and outside . . . and cut to the length you require. You eliminate drilling, boring and rough facing operations, cut production time, and step up machine capacity when you use Crucible hollow tool steel bars.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking

HOLLOW TOOL STEEL

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.



More and more automotive repair shops and industrial plants are turning to FLEXLOCs to reduce maintenance on high speed, vibrating equipment.

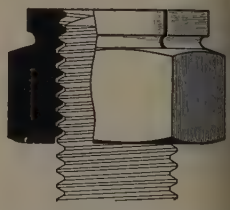
FLEXLOC locknuts save $600 per year in reconditioning automobile engines

By using FLEXLOCs on connecting rod bolts, a motor reconditioning shop cut assembly time by a minimum of 5 minutes per motor. This added up to a yearly saving of 250 hours or $600. No drilling of bolts was needed . . . no adjusting of nuts to set cotter pins was required. And the FLEXLOCs assured a tighter assembly than was possible with the castellated nuts and cotter pins formerly used.

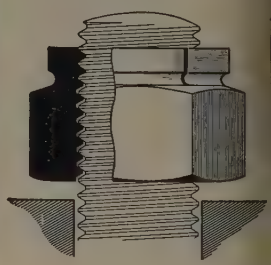
FLEXLOC locknuts reduce maintenance too. Once they are installed, you can forget them. Service and inspection periods can be stretched safely from days to weeks. And FLEXLOCs are reusable. They can be applied again and again without losing locking efficiency.

You can get FLEXLOC Self-Locking Nuts of various types and materials in a wide range of sizes and in any quantity. These one-piece, all-metal nuts are carried in stock by leading industrial distributors everywhere. Write for literature and samples for test purposes. STANDARD PRESSED STEEL Co., Jenkintown 33, Pa.

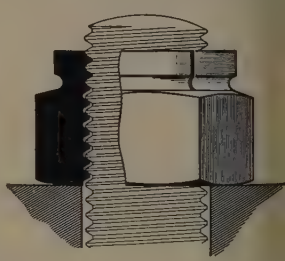
Starting. A FLEXLOC starts like any ordinary nut. Put it on with your fingers. Tighten it with a standard hand or speed wrench.



Beginning to Lock. As the bolt enters the segmented locking section, the section is expanded, and the nut starts to lock.



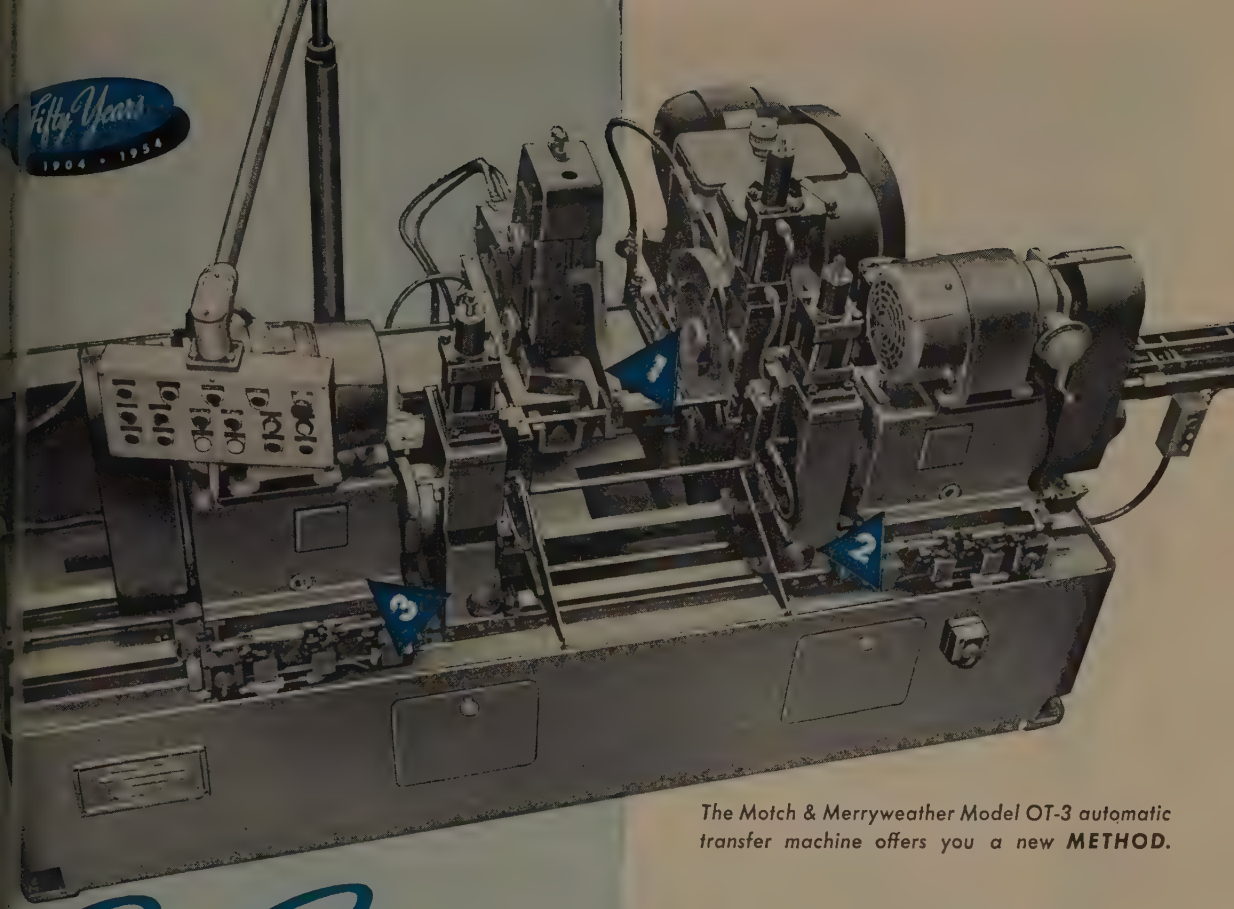
Fully Locked As a Stop Nut. When 1½ threads of a standard bolt are past the top of the nut, the FLEXLOC is fully locked. A FLEXLOC does not have to seat to lock.



Fully Locked As a Seated Nut. When it is used as a lock or stop nut, the locking threads of the FLEXLOC press inward against the bolt, lifting the nut upward and causing the remaining threads to bear against the lower surface of the bolt threads. Vibration will not loosen a FLEXLOC, yet there is no galling of threads.

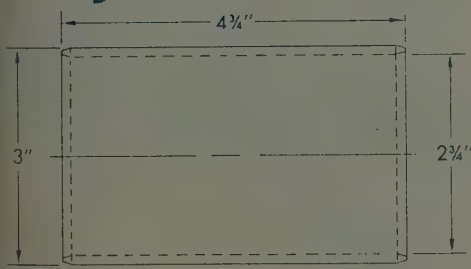
FLEXLOC® LOCKNUT DIVISION

SPS
JENKINTOWN PENNSYLVANIA

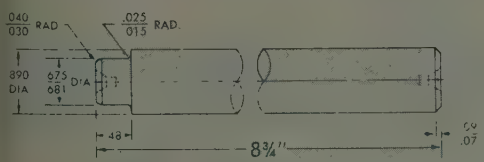


The Motch & Merryweather Model OT-3 automatic transfer machine offers you a new ***METHOD.***

Buy Profits – PUT 3 HEADS TO WORK SIMULTANEOUSLY!



OPERATION: Cut off, chamfer inside and outside, and face.
MATERIAL: SAE 1020 steel tubing.
PRODUCTION: 140 pieces per hour.



OPERATION: Cut off, turn radius, chamfer and center drill one end; chamfer and center drill opposite end.
MATERIAL: SAE 1020.
PRODUCTION: 288 pieces per hour.

Cut off to square, accurate, milled-finish lengths and double-end machine your work continuously, and simultaneously. Bore, face, chamfer, center drill, turn, ream, or groove singly or in combination. Cut-off time is virtually free. Save labor; save tooling, time, overhead, floor space.

THE MOTCH & MERRYWEATHER MACHINERY CO.

CLEVELAND 13, OHIO

AP/SF
Production per Square Foot

Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.

2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 90,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength in accordance with SAE Grade 5. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength in accordance with SAE Grade 2. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

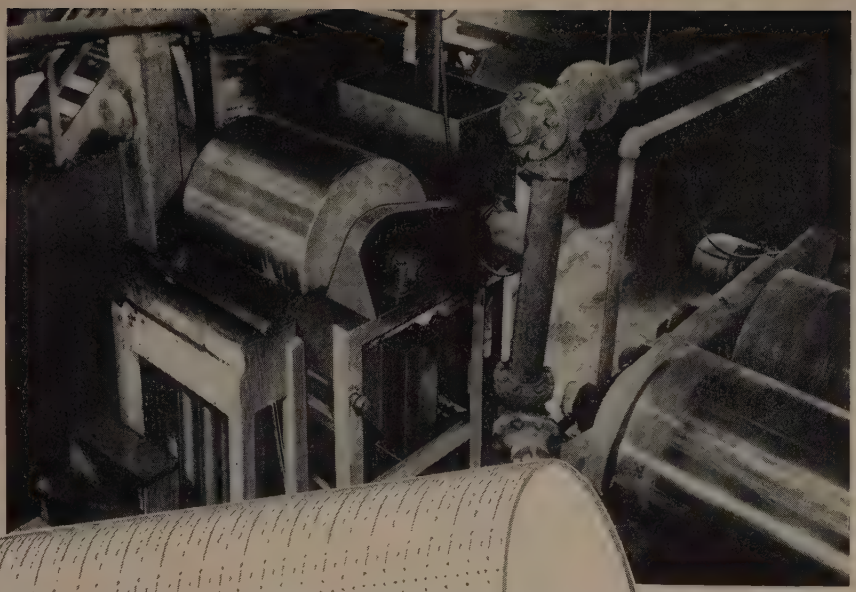
Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

STANDARDS carried by LEADING DISTRIBUTORS

* **SPECIALS** furnished to BLUE PRINT SPECIFICATIONS

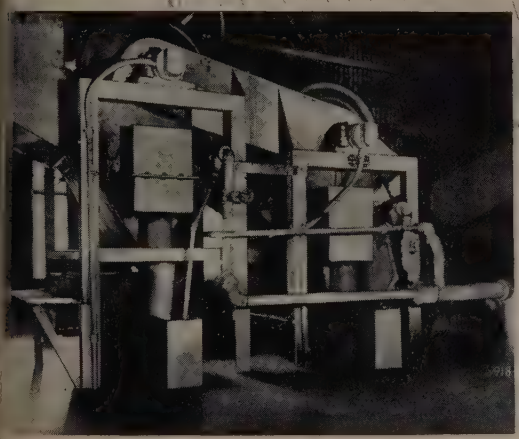
WRITE FOR INFORMATION

SEND FOR SAMPLES



Jeffrey Counterflow Rougher and a Two-Drum Jeffrey-Steffensen Separator at Scrub Oaks

Jeffrey Drum-Type Magnetic Separators Simplify Flowsheets, Increase Recoveries



Type C-2 Cobbers in operation at Oxford

Alan Wood Steel Company, Conshohocken, Pa., has simplified flowsheets and improved metallurgy by converting its mills at Scrub Oaks and Oxford to Jeffrey Drum-Type Magnetic Separators. The installations have resulted in an increase in recovery and sizable savings in floor space requirements.

Scrub Oaks mill will utilize 11 drums, including Type C-2 Cobbers for primary roughing . . . Counter-flow Type Roughers on both rod and ball mill products . . . Jeffrey-Steffensen Two-Drum Separators for final concentration of fine products.

At Oxford two Type C-2 Cobbers with a common drive handle +20 mesh portion of roll crusher product, producing a final concentrate, a low-grade tailing, and a middling product that returns to crusher in closed circuit.

Write for descriptive literature and technical data

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

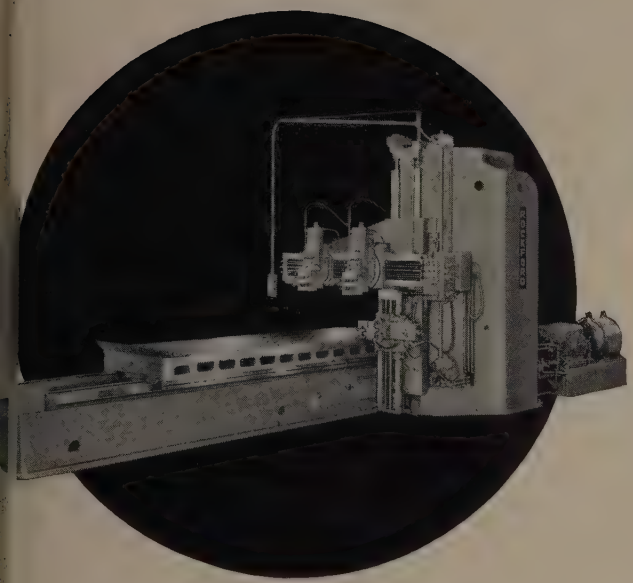
hydraulic drive...a natural for

CHECK-POINT OF MAXIMUM INVESTMENT RETURN

Rockford Machine Tool Co.

reciprocating machine tools

Hydraulic Drive and Feeds, as basic features in modern machine tool design, provide outstanding performance, measured in terms of work quality, high production and low operating cost.
We have had over 25 years of experience in applying Hydraulic Drives and Feeds to Shapers, Planers and Slotters.



rockford hydraulic planers

Rockford Hydraulic Planers are designed and built for greater precision, heavier cuts and the use of new types of alloy and carbide cutting tools.

Table, bed and column are designed to withstand heavier cutting pressures. Column, with six-foot cross section and increased bearing on bed, assures accuracy,

Exclusive L-type cross-rail construction affords maximum bearing on column with resulting rigidity. Adjustable side-head rail assures accurate and permanent alignment of side head with rail heads.

shaping / planing / duplicating / turning

our 52nd year

Rockford, Illinois

Need compact bearings for long service?

here's how leading makers of small gasoline engines get them with NEEDLE BEARINGS

America's best known manufacturers of small gasoline engines specify Torrington Needle Bearings because of their compactness, high capacity and long maintenance-free operation.

Needle Bearings have been *performance-proved* in every type of small two-cycle and four-cycle engine such as those on power mowers, generators, chain saws, materials handling equipment, pumps, compressors and many other types of equipment.

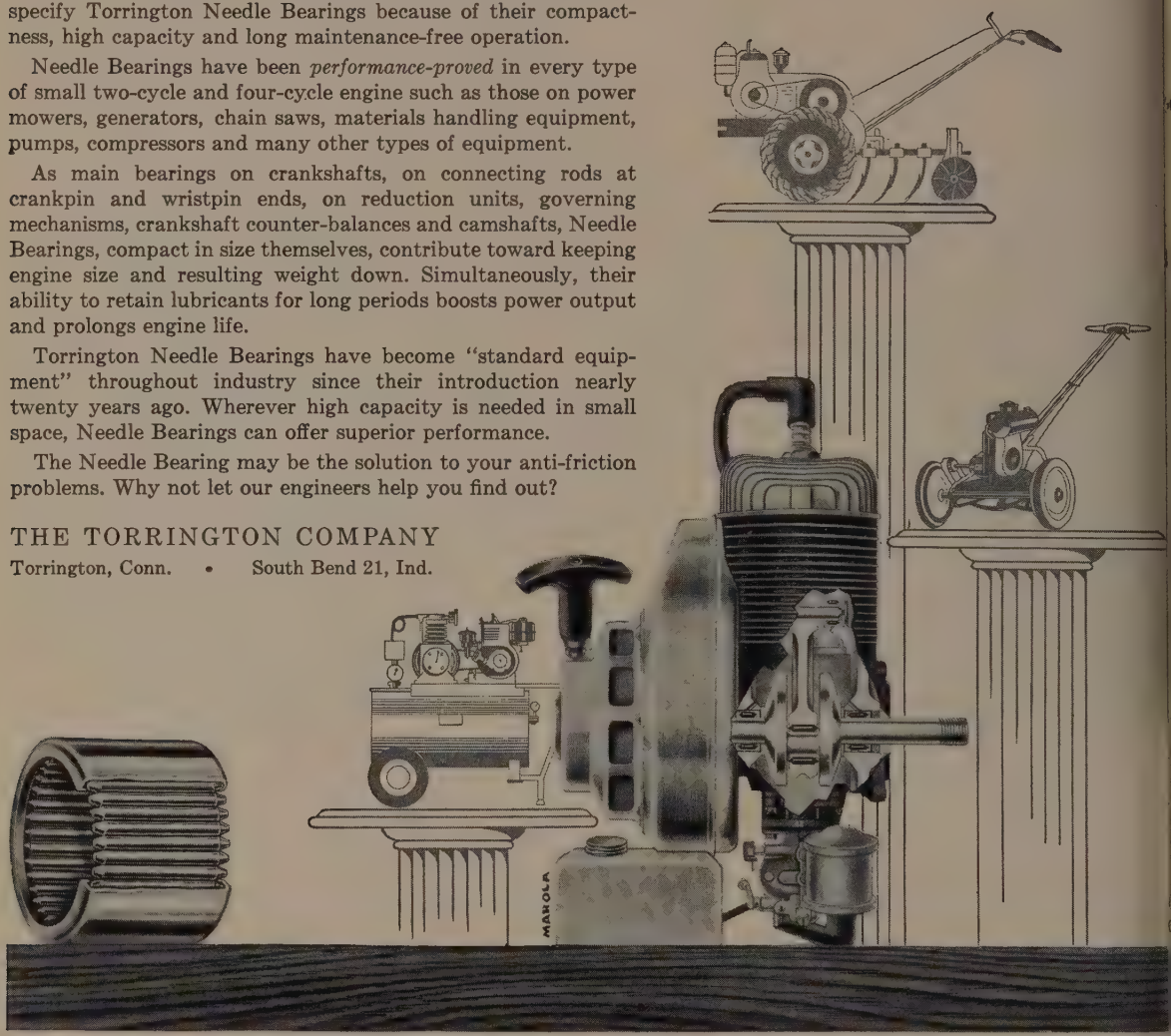
As main bearings on crankshafts, on connecting rods at crankpin and wristpin ends, on reduction units, governing mechanisms, crankshaft counter-balances and camshafts, Needle Bearings, compact in size themselves, contribute toward keeping engine size and resulting weight down. Simultaneously, their ability to retain lubricants for long periods boosts power output and prolongs engine life.

Torrington Needle Bearings have become "standard equipment" throughout industry since their introduction nearly twenty years ago. Wherever high capacity is needed in small space, Needle Bearings can offer superior performance.

The Needle Bearing may be the solution to your anti-friction problems. Why not let our engineers help you find out?

THE TORRINGTON COMPANY

Torrington, Conn. • South Bend 21, Ind.



TORRINGTON *NEEDLE* BEARINGS

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

Trade-marks of leading manufacturers of small gasoline engines who use Needle Bearings.

KX-99 . . . the one refractory for furnace linings . . . bottom, hearth, bosh, inwall and top.

KX-99 . . . proved in actual use by leading steel companies. KX-99 blast furnace linings have produced record tonnages . . . at low cost per ton.

KX-99 . . . a special high-fired brick that resists carbon monoxide disintegration. In actual service for an average of seven years in several furnaces, KX-99 showed no trace of carbon monoxide disintegration.

KX-99 . . . rugged, tough and dependable. Highly resistant to attack by basic slags, chemical action and abrasion.

KX-99 . . . manufactured to extremely close tolerances . . . uniform in dimensions . . . free from warpage.

The A. P. Green Fire Brick Company Engineering Department will assist you with further information concerning the application of KX-99 Blast Furnace Brick . . . write

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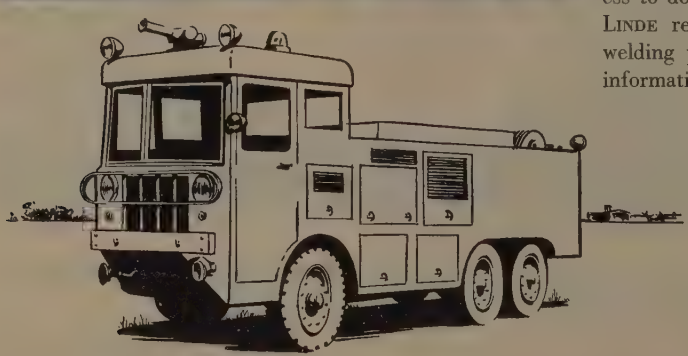
the FIRE TRUCK *that flies*

From rumbling horse drawn wagons, to the massiv pump-trucks of today—weight has been the common cha acteristic of mobile fire-fighting equipment.

However, with the expanding science of fire-fightin there came new demands of equipment. The United State Air Force had need for fire trucks fully equipped, yet ligh enough to be carried by air to landing strips the world over Such trucks are now in production—fabricated by HELIAR and sigma welding.

The fire truck's rigid lightweight all-aluminum body which varies in thickness from 14 ga. to ⅜ in., is com pletely welded by HELIARC and sigma welding at speeds u to 25 in. per minute. Because welding speed is high, an inert gas welding eliminates expensive post-weld cleanin this manufacturer turns out three units a day—employin only 40 men.

Research and years of experience have helped LINDE t develop a top notch team of fabricating processes—HELIARC sigma and UNIONMELT welding. For small shops or hug production lines, from carbon steel to complex alloys an non-ferrous metals—there is a LINDE electric welding proc ess to do the job efficiently and economically. Your loca LINDE representative will help you determine the bes welding process for your job. Call him today for mor information.



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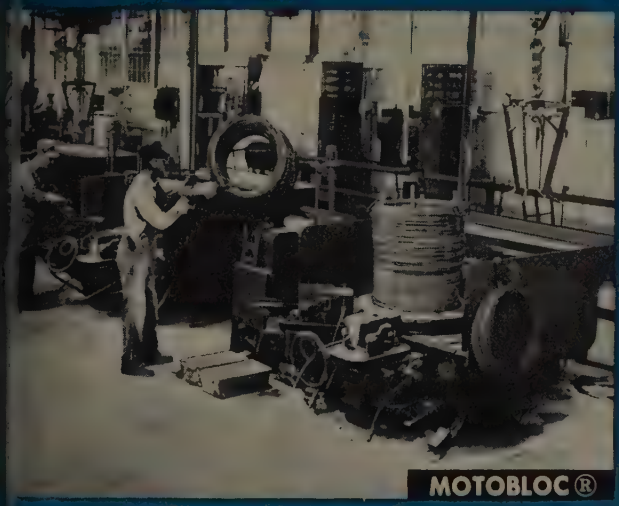
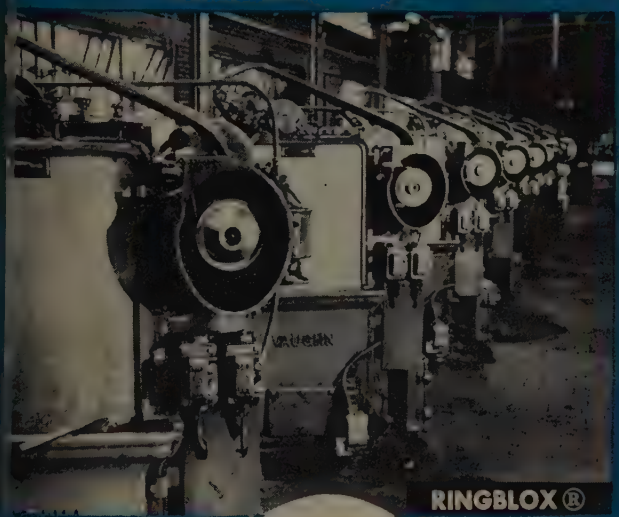
in types, sizes and capacities to profitably handle your jobs!



MOTOBLOC®

MOTOBLOX®



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COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

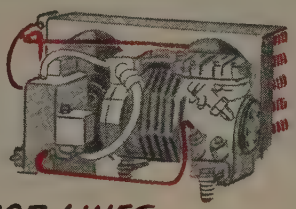
The CECO-DROP makes other gravity drop hammers obsolete

Builders of THE IMPACTER

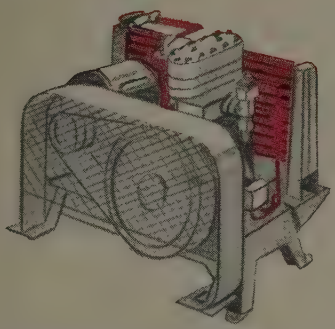
"FORGING IN MID-AIR"

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, P

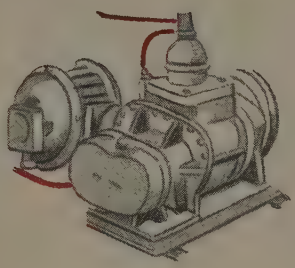
FROM *the Bundy Sketchbook*
TO *jog a designer's imagination*



COMPRESSOR LINES



SERPENTINE COILS IN CONDENSER UNIT



VACUUM PUMP LINES

TV TRAY TABLE

REMARKS Is that cost-saving idea wasting away in a notebook? Then why not let expert Bundy engineers help bridge the gap between idea and finished product. They offer you specialized engineering skills, unmatched fabrication facilities, plus the priceless extra of Bundyweld, the only tubing double-walled from a single strip (see below).

WRITE today for catalog for help in developing your tubing ideas.

BUNDY TUBING COMPANY, DETROIT 14, MICH.

WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper-coated steel. Then it's . .

continuously rolled twice around laterally into a tube of uniform thickness,

and passed through a furnace. Copper coating fuses with steel. Result . . .

Bundyweld, double-walled and brazed through 360° of wall contact.

BUNDYWELD TUBING®

DOUBLE-WALLED FROM A SINGLE STRIP

Leakproof	Lightweight
High thermal conductivity	Machines easily
High bursting point	Takes plastic coating
High endurance limit	Takes plating
Extra-strong	Bright and clean
Shock-resistant	No inside bead
Ductile	Uniform I.D., O.D.

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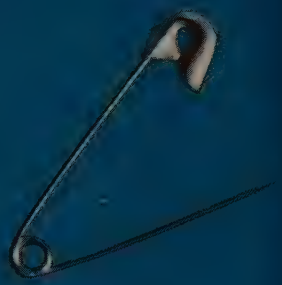
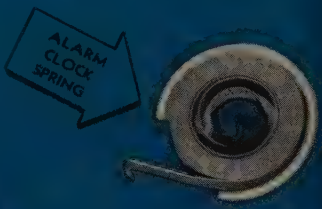
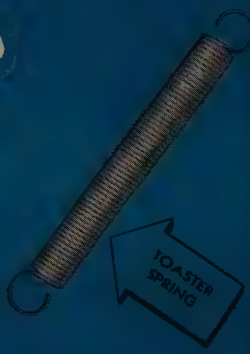
Bundyweld nickel and Monel tubing are sold by distributors of nickel and nickel alloys in principal cities.

What would You do without them?







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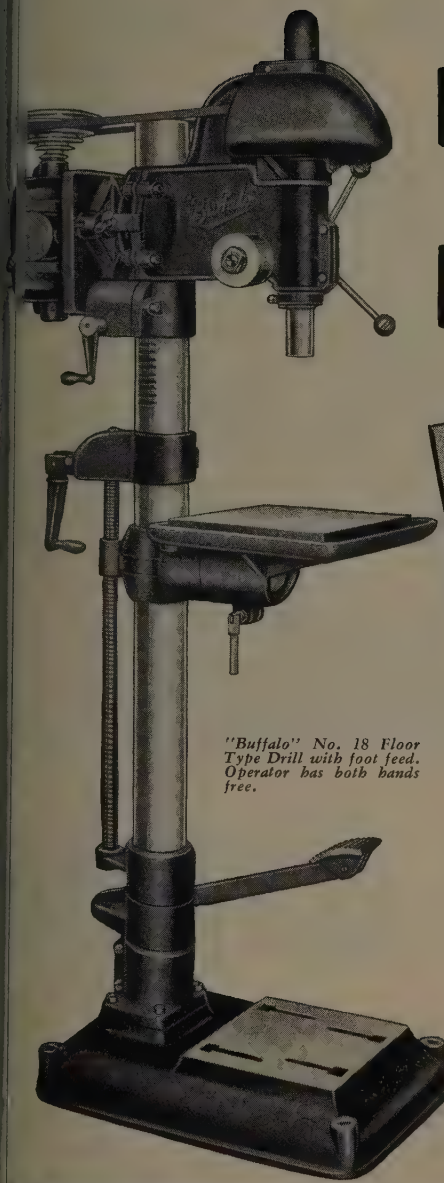
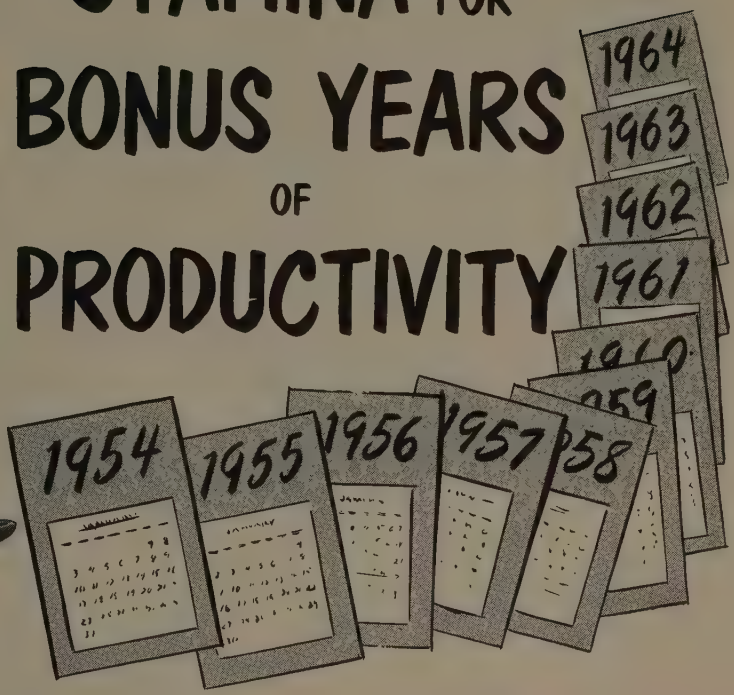


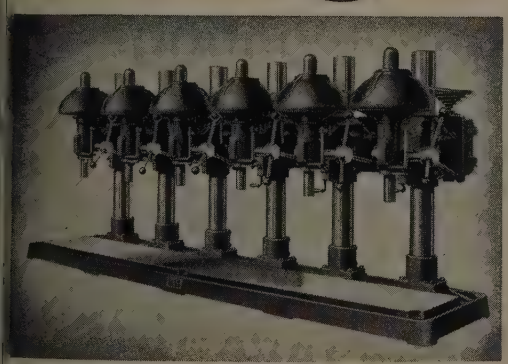
"Buffalo" No. 18 Floor Type Drill with foot feed. Operator has both hands free.



. . . Yours In The Shop-Proven "Buffalo" No. 18 Drill

Its heavy-duty, precision-machined spindle runs smooth and true on ball bearings . . . free of end play . . . designed and built to stand the endless punishment of high-production work. Its feed controls are intelligently placed for minimum fatigue during long runs. Setup adjustments are easily and speedily made by convenient cranks. And you can get this workhorse drill in a choice of 12 models, in 1 to 6-spindle bench or pedestal units to suit your exact requirements. Drilling capacity, up to 1" in cast iron.

Here is a machine that is bound to hike your output, improve accuracy and reduce repairs and obsolescence to the bone. Think of the profits it could be making for your shop . . . . right now! Why not write for Bulletin 3123 and investigate it further?



"Buffalo" No. 18 Drills are available in as many as 6 spindles for operation with several setups on a production line.

BUFFALO FORGE COMPANY

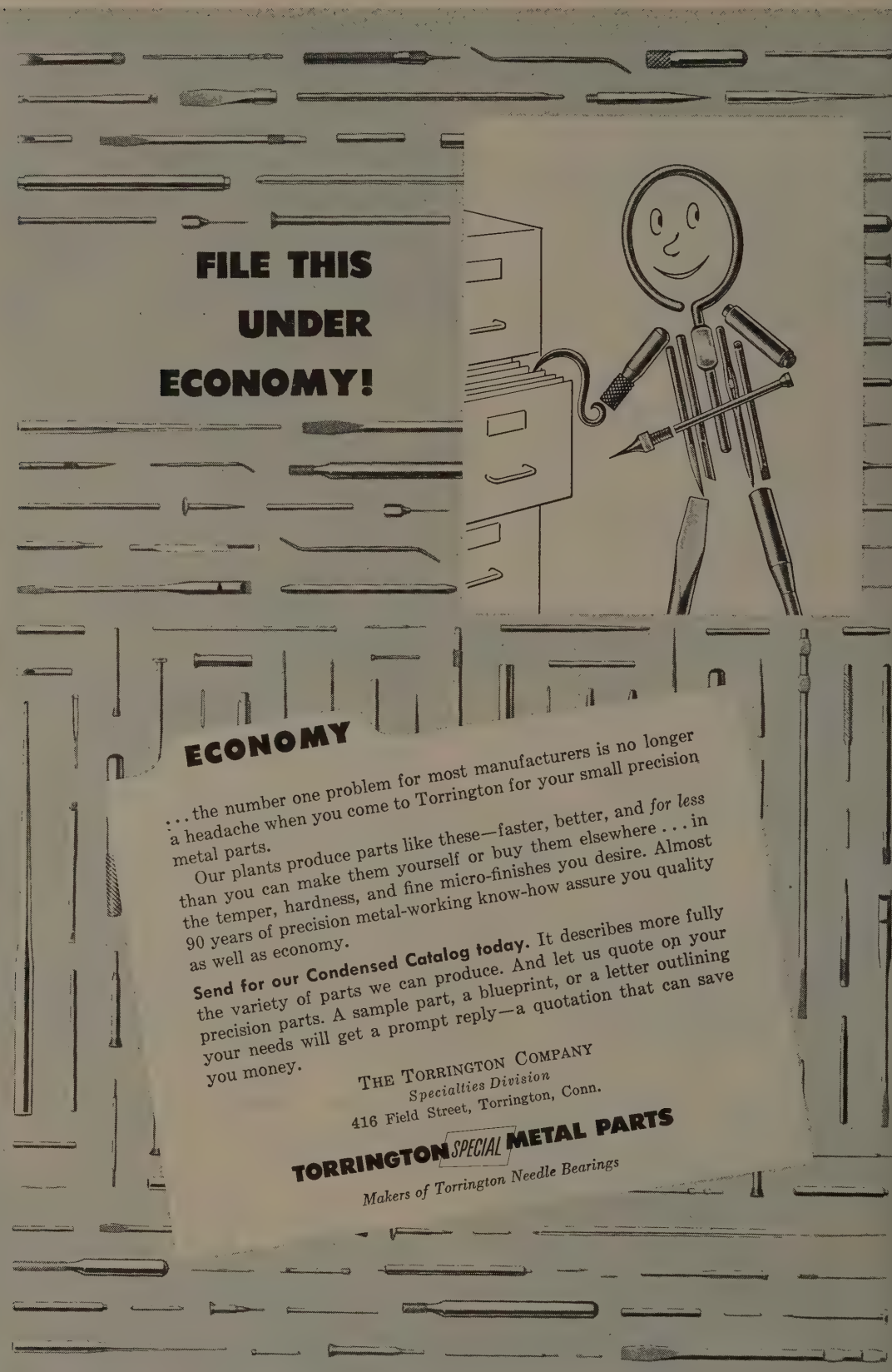
158 Mortimer St. Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" MACHINE TOOLS

DRILLING PUNCHING

SHEARING BENDING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FOR EIGHTEEN YEARS and through thousands of tests, engineers have been seeking the answer to the question . . .

How hard can the sea bite?

When that question was asked about a material, the answer seemed easy to get. Almost *too* easy.

All that engineers did at first was to add salt to water to get the same saltiness as sea water. Then dunk a sample long enough to find out what would happen.

That *was* easy. But it *was not* the right answer. No one really knew how corrosive natural sea water could be . . . with its multitude of dissolved chemicals, its changing temperatures, its tides and currents, its living organisms and abrasive sands.

Right answers are available now, though. For during the last 18 years Inco Corrosion Engineers have tested various effects of real sea water on some 35,000 specimens. Working at seaside testing stations, they have run tests on many materials in salty atmosphere. Or in live sea water. Or exposed to both alternately, through tidal action. They've studied the effects that velocity, marine growth and methods of coupling have on the deterioration of many metals.

If you're troubled by a problem arising from the sea around us, there is a chance that Inco engineers may already have the basis for an answer from their studies at the Kure Beach Corrosion Testing Station.

But, of course, yours may not be a marine problem. You may be much more interested in corrosion of some other sort: atmospheric, chemical, high temperature, or the *effect* of metallic breakdown on the quality of products being processed.

Whatever your particular corrosion "headache," the cure may be already available in Inco's mass of catalogued data on the behavior of metals under all kinds of conditions. The answer may well be an Inco Nickel Alloy. If no immediate answer is indicated, special investigation may be initiated to provide one. A special series of tests might be run for you . . . tests of *any* sort.

It's our job to help metals perform better. Why not write us in detail about your own problem? Better still, ask for one of our Corrosion Data Work Sheets to assist you in presenting your problem easily. Address The International Nickel Company, Inc., 67 Wall St., New York 5, N. Y.

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Metalworking Outlook

Regrets About March

The administration regrets its emphasis on March as a crucial month to determine which way the economy is going. It now says the March-April-May spring seasonal trend is the thing to watch. Some encouraging developments are turning up this month, such as the slight employment upturn in Detroit (p. 74), but nothing dramatically optimistic. Actually, Washington's pessimism is largely confined to the capital. Spot checks by STEEL in industrial centers reveal moderate optimism. The consensus: Business in 1954 will be down about 5-10 per cent from 1953, but the drop is not alarming.

Nature Steps In

The economic weather is being affected by the climatic weather, notably in the Great Lakes area. Heavy snows and high winds broke power lines and snarled transportation to such an extent last week that many plants were down. Normal operations should be resumed this week in all but a few of the hardest hit facilities.

Living Costs Stable

Look for the cost-of-living index to hold at close to the present level of 115.2 for the next three months. Food costs, the major cause of the slight climb from December to January, traditionally drop in the spring. The index is still below the all-time high of 115.4 reached last Oct. 15, a peak which gave a 2-cent boost to more than 1 million auto workers under the escalator formula. The Jan. 15 level took one cent away from them. For March, April and May, most of the workers under the formula will receive a total hourly cost-of-living allowance of 7 cents.

Scrap Men Study Conditions

Dismal economic prospects for scrap persist. But industry sentiment is still against any government stockpiling as a means of alleviating the situation. The scrap dealers would welcome some U.S. aid, though, to ease the financial pinch. That could perhaps take the form of emergency loans. Directors of the Institute of Scrap Iron & Steel Inc. will hold a special meeting in New York Mar. 17 to study conditions.

By the Hair of Your Chin

A fertile business crop grows on men's chins. The nation's manufacturers of electric shavers expect to sell $100 million worth to 4 million people in 1954. Last year $98 million worth was sold, 38 per cent better than in 1952. Schick Inc., Remington-Rand Inc. and Sunbeam Inc. make some 90 per cent of all units. A new producer coming into the market in April will be Ronson Art Metal Works Inc., maker of cigaret lighters.

One Way To Fly High

Business is flying high in at least one way. Business flying has increased almost 900 per cent since 1940, says Civil Aeronautics Administration. Last

year some 30,000 company or individually owned aircraft logged 3.1 million hours, 600,000 more than the revenue hours of scheduled domestic air lines. The outlook in 1954 is for even more industrial aviation as civilian aircraft output climbs.

Progress Payments Continue

Progress payments will continue to be made as work progresses on defense contracts. But the Defense department is tightening up on abuses of the procedure. It says that percentage rates and cost bases for progress payments on new procurement should be determined on a minimum basis commensurate with the contractor's production schedule requirements and minimum inventory lead time, with due regard to his projected cash needs and cash resources. Any adjustment of progress payments on active contracts will be scrutinized particularly closely by Defense.

Sign of the Times

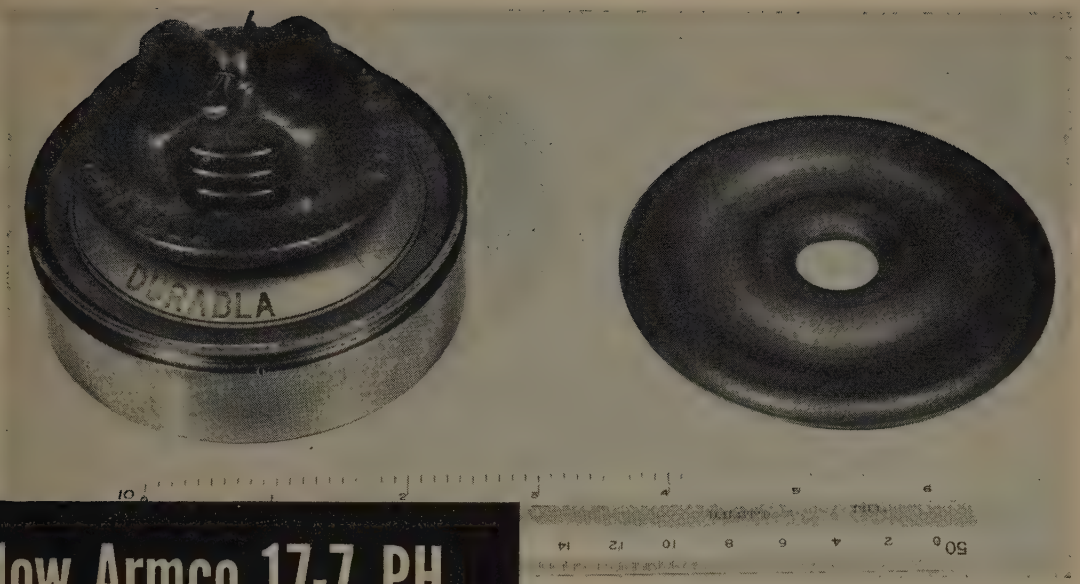
Here's what a 23-week strike can do, both to a company and its employees. Net profit of Nicholson File Co., Providence, R. I., on eight months' operation in 1953 was $119,524, compared to $1.2 million in the 12 months of 1952. Based on the average pay of $80 a week, the 1000 strikers lost $1.8 million in wages during the strike period. With the 6-cents-an-hour increase upon which the dispute was settled, employees will have to work 766 weeks, or 14 years and 38 weeks to make it up.

Straws in the Wind

Chrysler Corp.'s Plymouth division offers a new PowerFlite automatic transmission on its 1954 models for $175; with the unit new owners will get the beefed-up 110-horsepower PowerFlow engine. . . Maritime Administration is preparing a request to Congress for funds to implement a shipbuilding program to include construction of $20-million passenger ships, a tanker trade deal to swap two old ones for one new one and experimental work on Liberty ships. . . Creditors of Muntz TV Inc. have petitioned for reorganization of the company under the Federal Bankruptcy Act. . . U. S. Steel Corp. is considering the installation of a sintering plant at its Fairless works because Venezuelan ore is more powdery than U. S. varieties.

This Week in Metalworking

Wilkes-Barre, Pa., proves a local area can do something about unemployment (p. 73). . . Sales-conscious machine tool builders size up Japan as the largest potential foreign market for the next two years at least (p. 75). . . Housing booms are getting bigger (p. 76). . . Fact-finding program of the Bureau of Census will be quickened and strengthened if recommendations of the Intensive Review Committee are implemented (p. 77). . . Industry's hopes for a reduction in corporate taxes fade (p. 77). . . Here's a slightly different approach to industrial research (p. 78). . . Government continues to push for metal birthmarking (p. 79). . . Scientific apparatus makers expect another good year (p. 84). . . Great Lakes Carbon Corp. sells in reverse to win long-term market gains (p. 85).



How Armco 17-7 PH Solved This Valve-Disc Problem

ARMCO

Four years ago Armco 17-7 PH Stainless Steel was first used in a manufacturer's check valves. It met all requirements and continues today as the best metal for his valve discs.

Difficulties with Standard Stainless Types

Non-hardenable chromium-nickel stainless steels formerly used often proved too soft—sometimes had to be nitrided. The standard hardenable stainless steels like Types 410 and 420 presented the problems of excessive hardness, cracking and distortion either before or after grinding.

Precipitation-Hardening Solved the Problem

Armco 17-7 PH, in soft condition, blanks and forms readily to these valve discs. The double low-temperature heat treatment then develops the hardness desired without distortion. To attain a hardness of Rockwell C-41 minimum, Armco 17-7 PH is held at 1400 F for 1½ hours, cooled to 60 F, then heated to 950 F for ½ hour and cooled. This treatment produces a 0.2% offset yield strength of 165,000 psi minimum in tension or compression.

Sheets, Strip, Plates and Bars

Armco 17-7 PH is produced in soft condition for double heat treatment in sheets, strip, plates and bars. It is supplied cold-worked for single heat treatment at 900 F in sheets, strip and wire. For further information on this precipitation-hardening stainless steel and its companion grade, Armco 17-4 PH, write for our latest bulletin.

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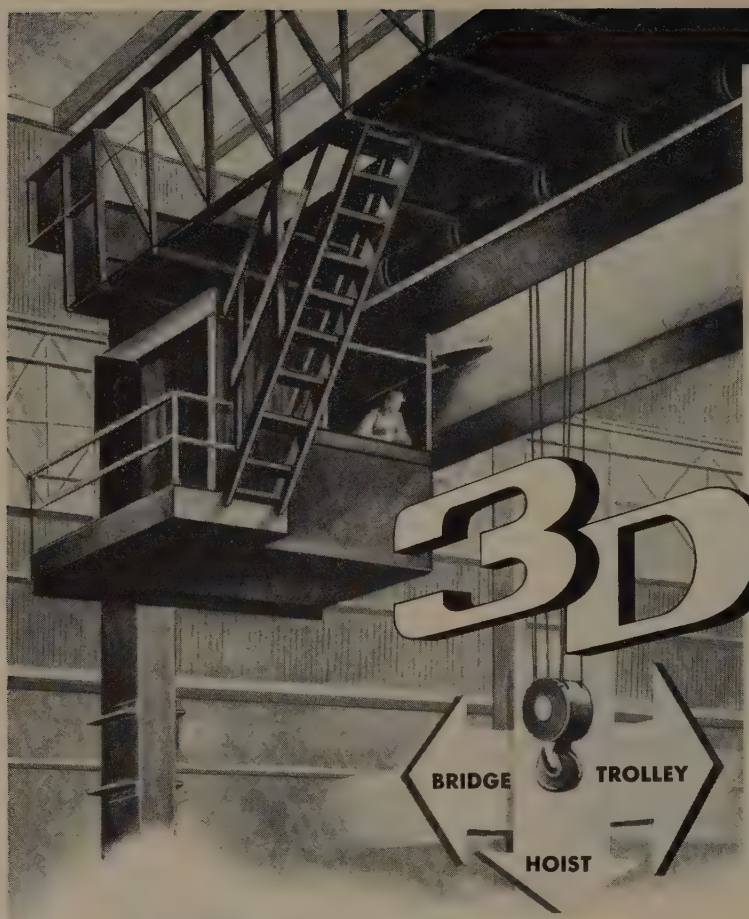
4583 Curtis Street, Middletown, Ohio
Export: The Armco International Corporation



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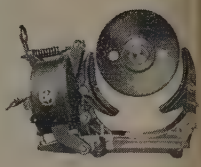
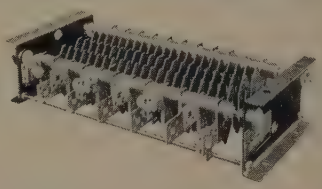


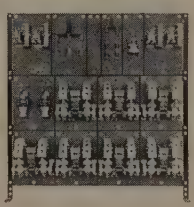
Long-Life Brakes for cranes operated by a-c or d-c power . . . give high speed performance with low upkeep.

Youngstown Safety Limit Stops protect against overhoisting accidents . . . a positive check against human errors.

Cam-Type Master Switches have narrow width and short throw . . . less fatigue for the operator.



Tab-Weld Plate Resistors feature spot-welding that provides a continuous path and keeps resistance value constant.



Reversing - Plugging Control for bridge and trolley motions . . . automatically controlled acceleration and only one adjustable relay for plugging.

Manual - Magnetic Disconnect Switches operate with ease . . . are arranged to control crane lights also.

No Time for Complacency

On June 23, 1947, the 80th Congress passed the Taft-Hartley Act over the veto of President Truman. In overriding the veto, Congress was reflecting the will of a great majority of the American people, who felt that the Wagner Act gave too much power to union leaders. It passed the Taft-Hartley Act as a means of restoring a better balance of power between employers and unions and of affording greater protection for union members and the public.

Specifically it reaffirmed the right of employees to bargain collectively as provided in the Wagner Act. It retained unfair labor practices which prohibit employer interference, discrimination and refusal to bargain collectively. However, it also added six new union unfair labor practices which regulate union activities such as imposition of excessive dues, secondary boycott and featherbedding.

Largely because of these provisions which are intended to protect union members and the public from abuses of union power, union leaders without any conspicuous exceptions have called Taft-Hartley a "slave labor law" and have assailed it bitterly at every opportunity. They persist in this attitude even though all evidence shows that the health and strength of legitimate unionism have improved rather than declined under Taft-Hartley auspices.

When the Eisenhower administration assumed office early in 1953, some of the President's advisers advocated revisions in the Taft-Hartley Act that went beyond modifications implied in the Republican party's platform. Later, during the Durkin fiasco, it became apparent that somebody in administration circles was intent upon revising T-H in ways that would win favor with powerful union leaders.

In his recent message to Congress the President asked the lawmakers for only about half of the 19 demands listed by Durkin. This fact, plus Mr. Eisenhower's strong recommendation for a secret strike vote under government auspices, has given many industrialists a false sense of reassurance that all is well in regard to the treatment of T-H in Congress.

Unfortunately all is not well. This is no time for complacency. There still remains too much danger that the present tinkering with T-H will result in strengthening union monopoly rather than curbing it.

E. C. Shaner

EDITOR-IN-CHIEF

SOVIET "INADEQUACIES": In spite of creditable progress in the expansion of Soviet Russia's iron and steel capacity since the end of World War II there are signs that some phases of current operations are far from satisfactory to the men in the Kremlin. Careful scrutiny of the inside pages of *Pravda*, official Russian newspaper, frequently reveals reports

of what the Soviets call "serious inadequacies in organizational-technical management."

Apparently these "inadequacies" (p. 83) include the odd behavior of the management of the Seversky plant in ordering the shutdown of the billet department's No. 2 soaking pit for repairs but failing to make any preparation for the repair work. Another inside page of *Pravda's* criticism is that of "unrhythmic production." It seems that in some plants workers loaf during the first ten days of each month, speed up a bit during the next ten days and then work in a frenzy during the last ten days in an effort to meet their monthly quotas.

* * *

CHILDISH ACTS OF REDS: These reports are reminiscent of stories brought back by American engineers who went to Russia in the twenties to build iron and steel plants, petroleum refineries and manufacturing establishments for the youthful U.S.S.R. These stories pictured the Russians as naive innocents who found it difficult to become serious about industrial problems.

A favorite story of that period had to do with the erection of a blast furnace in a remote province. The rule of the Kremlin was that when the steel at the highest point of the stack was in place, a local celebration could be staged and a message should be sent to Moscow announcing the achievement. On one furnace, long before the steelwork was up to the maximum height, local authorities began preparing for the big moment. They built a wooden scaffold alongside the furnace. Its platform was even with the ultimate top of the furnace. Eager to make a good showing, the local authorities staged their celebration prematurely.

They raised the Red flag, wired Moscow of the completion of the job, and in the midst of the excitement the platform collapsed, killing scores of people.

* * *

DUPES ARE GULLIBLE: Other stories brought back from Russia by American engineers almost 30 years ago, recounted numerous occasions when furnaces were tapped with no ladle car in position to receive the molten metal. In the early days of Soviet ascendancy, this little detail did not appear to be important.

In 1946 in Manchuria, Chinese dupes of Russian agents approached the power station delivering power from the Yalu river to Mukden. The Red saboteurs were intent on putting the power line out of commission. They began working on a large control panel with sledge hammers. The lone Chinese attendant, a Nationalist, humbly suggested to the Reds that if they would pull a certain switch they could cause much more damage than could be accomplished by sledge hammers. The Reds pulled a "dead" switch and departed.

The Shenyang Railroad Hotel and a few other favored buildings in Mukden enjoyed electricity that night by virtue of the gullibility of the Reds.

* * *

WILKES-BARRE'S PLAN: According to the Department of Labor there are 59 industrial areas in which there is a "labor surplus." Some weeks ago we listed these areas. Among them was Wilkes-Barre. A prominent citizen of that city who heads a really remarkable civic promotional project sent us a letter stating that while Wilkes-Barre was on the list its citizens were doing a remarkable job of developing new job opportunities.

We asked William O. Sword, writer of the letter, if STEEL could send an editor to Wilkes-Barre to study at close range what his organization is doing to create jobs. He agreed. Our editor was given every courtesy and every opportunity to get all the facts. The Greater Wilkes-Barre Industrial Development Fund and the more recent Committee of One Hundred have done wonders in a community that was confronted with a serious problem. They have a formula that should interest every labor surplus area.

* * *

EAST NEEDS MACHINES: It is not surprising that American machine tool builders are rechecking opportunities (p. 74) for sale to Japan. Their records show that the Japs were prolific liars 15 years ago, when unknown to us, they were preparing for Pearl Harbor.

During the war, Japanese industry took a terrific beating from American bombs. It is quite possible that incendiaries warped and rendered useless more machine tools in Japan than blockbusters incapacitated in German plants. At any rate, Japan is now a prime market for efficient machine tools.

You can also

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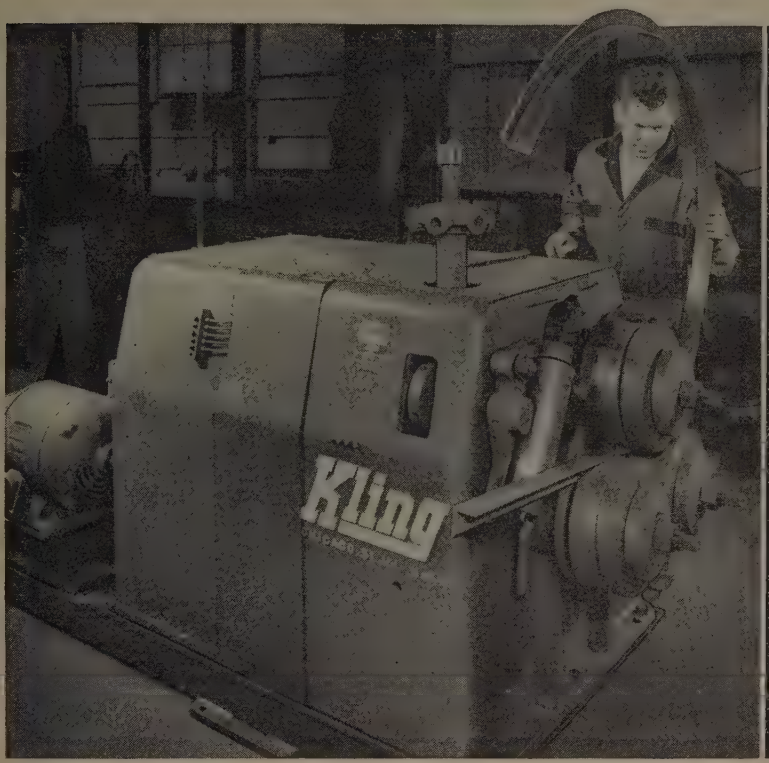
TO SAVE MONEY ON SHAPES*



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**At the side are shown some of the various Shapes you can roll with Kling Angle Bending Rolls*

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are used in the **"BEST OF COMPANIES!"*** *—to cut production costs*

Are you paying big prices for formed structural shapes and curved reinforcements like those illustrated? Then investigate the savings you can make by "rolling your own" on Kling Angle Bending Rolls. With these rolls you can also make your own gear blanks, motor housings, wheels, and many other machinery parts.

Kling Angle Bending Rolls are extra heavy construction; hand or power adjustment; designed to handle both angle and flat bars and can be equipped to handle forming of pipe, beams, channels, etc. Recent expansion makes Kling one of the leading producers of rolls of all types, including angle bending and plate bending (pyramid or initial pinch type) rolls.

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For detailed description of Kling Angle Rolls send for Bulletin 600.

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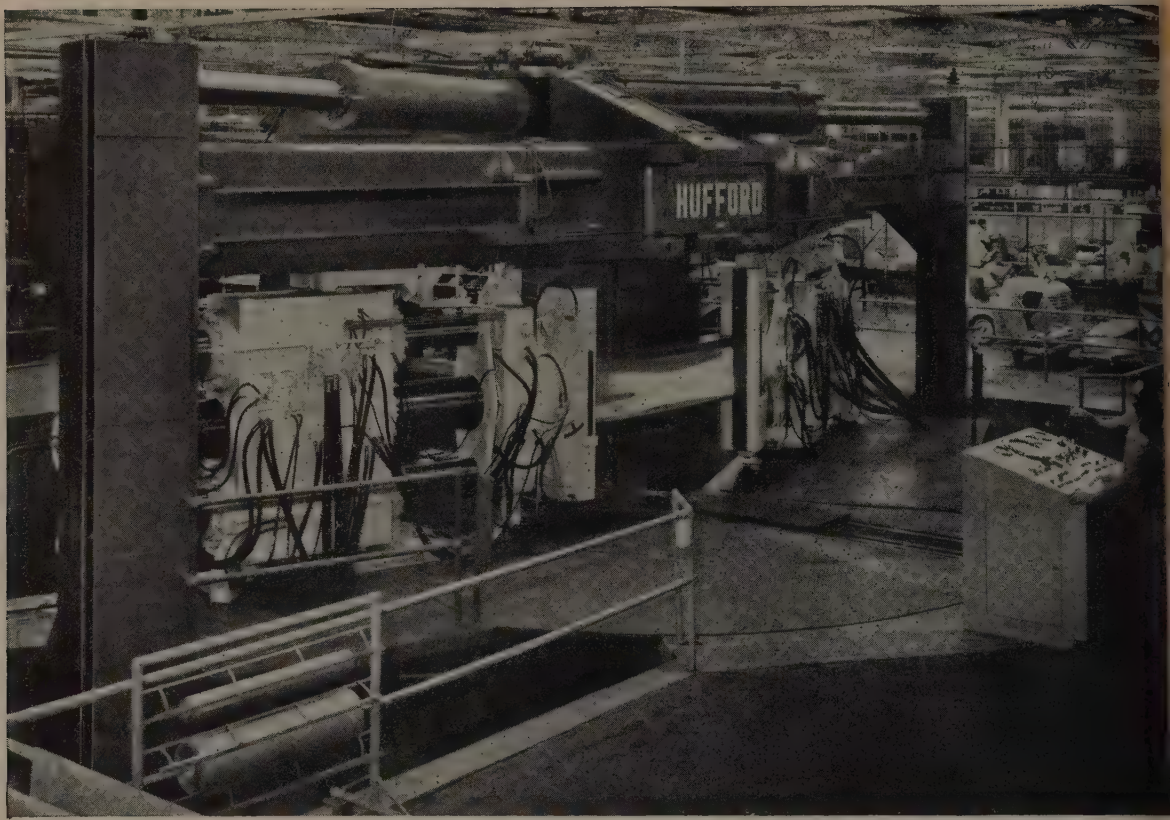

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leversing the Jobless Trend
ly Your Own Bootstraps

TH UNEMPLOYMENT now ve 3 million, what can be done the local-area level to combat problem?

n the nation today are 59 areas ssified as labor surplus areas the Labor department. Many taking action to solve their employment; in many cases it's problem of diversifying the instry of the area to lessen the ssibility that the entire work ce will be hit simultaneously joblessness.

Head Start—STEEL chose to go Wilkes-Barre, Pa., one of the Group IV areas, to report on program for attracting diversid industry. Actually, Wilkesrre has a head start on most eas. Its history of declining emoyment stretches back to predeession days: In 1930 anthracite ining was practically the only instry there and employed over ,000 workers; in 1953 the mine bs were estimated at 27,850 and ll declining.

In 1940, the Greater Wilkesrre Industrial Development Fund as formed to counteract the end. In 12 years it played the ajor role in securing 39 new rms and 9000 jobs for the area, t the end of the Korean war ith its defense cutbacks brought w problems, and unemployment gain began to rise.

The New—A new organization, ommittee of One Hundred, took ver the task with new aggressiveess in 1952. Its result: In less an two years 17 more new firms ere brought to the area and proided 2000 immediate jobs and a otential of another 1000; 11 local irms expanded facilities creating ther jobs.

Drive behind Wilkes-Barre's proram is a single pledge signed by he city's 227 top leaders in indusry, education, banking and labor: I will give of my time, talent and resources for my community as called upon. To supervise the activities, the committee called upon William O. Sword, president, Petroleum Service Co.

Capital a Must—"Our first task, after getting the assurance of complete co-operation from our area's top leaders, was to raise funds with which to conduct an effective, aggressive program," Mr. Sword says. In the initial campaign 486 persons contributed $730,000; the total has climbed to $1.2 million.

Step two was to secure ideal plant sites. In addition to smaller locations, the Committee of One Hundred purchased a 1500-acre land tract for development into an industrial park.

Labor on Hand—Supplying labor offered no problems to the officials —Wilkes-Barre had many men and women just waiting for a crack at a job. One of the outstanding phases of the over-all program, Herbert Morris, executive vice president of the committee, points out, is the co-operation of the labor unions. The leaders of all the unions form a labor council which functions as one of the Chamber of Commerce committees and takes an active part in the program for securing new industry.

Injecting further impetus into the labor supply picture to induce new industry to locate in Wilkes-Barre is a revamped vocational school program. Committee officials relate that formerly the vocational school programs did not serve the existing industry. Under the present program, vocational school officials channel their activities according to the needs of the area industry.

The Criterion — "Once you've achieved an active land-labor-capital combination, your objective becomes one of searching out prospects and going all out to prove that you really want them and

What Your Town Can Do About UNEMPLOYMENT

1. Start or intensify an area development program.
2. Get the support of civic leaders, especially industrialists, bankers, politicians and labor officials.
3. Strive for diversification in your area's industry.
4. Back your program; have enough money, plant sites.
5. Start or expand vocational schools to assure industry of adequate skilled labor.

that they belong with you," say the officials. The criterion in every instance should be: Does it provide more jobs? Here are some specific examples of recent activities of the Committee of One Hundred:

Foster Wheeler Corp. went to Wilkes-Barre with a contract it couldn't handle in one of its existing plants. Productivity of the work force in a rented plant there surprised Foster Wheeler officials who were already planning to build a new plant at a New York location. The Committee of One Hundred went into action. Foster Wheeler's employees had proved themselves, but the company had spent a considerable sum on the New York site. Wilkes-Barre agreed to provide Foster Wheeler with facilities equal to the New York location. The project cost Wilkes-Barre a quarter of a million dollars, but Foster Wheeler's new $6.5-million plant became the first to locate in the new 1500-acre industrial park. With it came jobs for over 110 and a future potential of over 400 jobs.

Confidence — Stressteel Corp. had been looking at several buildings in the New York-Pennsylvania area. It needed a building with crane facilities for its operations. The company was just forming, it was small and it had no past production or financial record to prove its responsibility as a going concern. Wilkes-Barre's committee saw 14 immediate jobs, with up to 100 in the future, so it placed $22,500 in escrow as a rent guarantee to the building owner.

United Steel & Wire Co. went to Wilkes-Barre with a defense contract and moved into a building erected by the committee. United Steel has a lease with option to purchase agreement on the structure. Employment is 150 now.

Wooing industry amounts to just good business practices on a high level. Officials offer this bit of advice, too: Once you've made a contact with a prospective company, expedite the details on the local level to make it as easy as possible for the company to start operations.

A Trade—Wilkes-Barre's record shows its tactics pay dividends. Latest move by the committee is the donation of 12 acres of land in its industrial park to King Fifth Wheel Co., Philadelphia, for a new factory. "Twelve acres is a small price for a new factory and 175 new jobs." That's the Wilkes-Barre philosophy.

Toledo Unions Join Industry Hunt

Union leaders in Toledo, O., joined in local efforts to secure new industry for the area. Franz Berlacher, vice president of the Teamsters Council-AFL, and Richard T. Gosser, vice president, United Automobile Workers-CIO, are members of the new Toledo Industrial Development Council.

Immediate aim of the council: Jobs for the city's 16,500 unemployed. Council activities formally began Mar. 1 in offices donated by the *Toledo Times*. Each of the unions contributed $10,000 for the council's first year of operation. Paul Block Jr., *Toledo Blade* and *Times* publisher, made a similar contribution, and the Toledo Chamber of Commerce is backing the council with $15,000.

Under agreement by the two unions, the question of which labor group will represent an incoming company's workers will be decided upon before the company moves in. In addition the representing union will give a guarantee of the maximum demands to be made.

Detroit Rehiring: Back to Work Movement Begins

DETROIT'S LABOR PICTURE is looking up. First days of March saw workers going back to Chrysler and Hudson plants, hard hit by the tight auto sales market.

Chrysler Corp. called back 2400 workers Mar. 1, another 5300 for its Plymouth assembly and body plants the next day. The Mack Avenue Plymouth body plant, on one shift since the middle of January, added a second shift. A second assembly line was reopened at Plymouth's main plant.

Hudson Too— Hudson Motor Car Co. caught the back-to-work spirit at the same time, calling back 4500 workers. Plymouth's rehiring boosted its Detroit employment to 8300; auto body plants to 27,650.

Two months earlier transportation equipment manufacturers' hiring rates were lagging behind every other major manufacturing group except stone, clay and glass products, Department of Labor, Bureau of Labor Statistics figures show. General hiring in January was about one-third below the postwar average for the month.

Countering the mild back-to-work trend, De Soto Division, Chrysler Corp., laid off 1000 workers late last week.

J› Tool Market Bright

›merican builders hopeful as ›he islands' industries need re-quipping

SALES-CONSCIOUS machine tool builders, whose export business has dropped steadily since 1948, are looking across the Pacific for new customers. They size up the Japanese market as having the largest potential of any foreign country over the next two years.

Japan's still-shaky economy is being bolstered by an industrial expansion program, but buying must be gradual for financial reasons. To get back on its feet completely, Japan must have export trade. To build that trade, it must have a production machine that will make it competitive in world markets. At least five years of steady rebuilding still faces the nation.

Promising—Needed most by Japanese industry are all kinds of standard high-production tools to get into volume production with cost-saving equipment. The Japanese tool industry isn't significant enough to supply the nation's needs: Because production is the tool builders' chief worry, variety of equipment is limited and designs are largely prewar. Germany exerts strong influence in Japan's tool market, but Britain does not, primarily because Japan is outside the sterling bloc.

Interest in U. S. machine tools was demonstrated by the success last October of the first postwar show of foreign tools in Japan. Staged by Cosa Export Co. Inc., a dozen U. S. companies had products on hand in Tokyo.

Observer — Recently returned from this show and a two-month inspection tour of Japanese industry, Frank U. Hayes, vice president and sales manager, Bullard Co., estimates his company will have annual sales of $1.5 million to $2 million in Japan this year and next. Visiting the country's three major industrial areas (Osaka-Kobe, Tokyo-Yokohama and Nagoya), Mr. Hayes found Japan's industrial machine badly in need of rebuilding. In its prime nearly 15 years ago, it was hard worked and badly damaged during the war.

For Squeezing Out Aircraft Bodies

This forged-steel main cylinder for a 12,000-ton extrusion press is being machined at Bethlehem, Pa., plant of Bethlehem Steel Co. When completed, the cylinder will be more than 22 feet long, seven feet in diameter and will weigh 88 tons. Cylinder will be part of a press at United Engineering & Foundry Co., Pittsburgh. Press will be used to produce aircraft structural sections

Tool Distributors See Modest Drop

CAPITAL goods industries look for 1954 to be one of their best. Most get pessimistic only when they compare it with 1953.

As one machine tool distributor puts it, "We will be below '53 in sales this year, about 5 per cent, but I think it's about time we stopped trying to set a new record every year anyway."

Still Healthy—At the spring meeting of the American Machine Tool Distributors Association at Boca Raton, Fla., last week, most members pegged this year's sales level at 10 to 20 per cent below last year's level.

Typical comments:

New England—"We may do as well in '54 as we did last year. January was terrific."

West Coast—"Right now we are down possibly as much as 50 per cent from 1953. That's not typical. We'll come up from that. We swing with the aircraft industry."

Midwest—"So far this year, we're way up as compared with late 1953. The year's average may drop but only 5 to 10 per cent. Government attitude has changed and that will help us."

Middle Atlantic—"We think 1954 will be a year for aggressive sales, but if that doesn't scare us, and it doesn't, why should we worry?

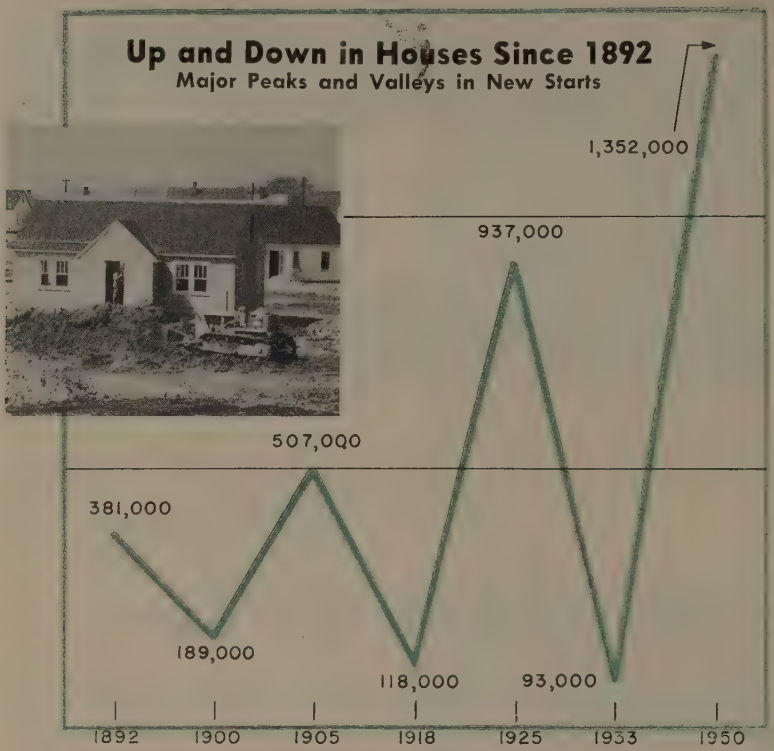
Favorable points — Thomas R. Rudel, association president, feels that two things will help hold machine tool sales at a good level. First is the need for new tooling in the automotive field as new model cars come off the drawing boards.

Second, Mr. Rudel believes defense programs now on the books will be activated this year.

The Government—Machine tool shipments this year will probably exceed $1 billion, estimates Charles F. Honeywell, administrator, Business & Defense Services Administration. He points out industry shipments in January were $94-million. Backlog at end of January was $600 million. Anticipated Department of Defense orders for the next six months are $150 million. The Secretary of Defense reserve fund has $250 million available and about $100 million will be spent this year. Those total $944 million with no allowances made for incoming civilian orders.

Threat—Today the U. S. Government owns 20 per cent of all the machine tools in the country. That's equivalent to from 3 to 4 years' output.

Wholesale leasing of this equipment for civilian production would threaten industry with the same Government competition as did the sale of surplus machines after World War II. Builders and distributors are trying to prevent a recurrence of that.



Bigger Booms for House Building

National Bureau of Economic Research study shows peaks and valleys of house building are being more pronounced. Current trend is toward cheaper, single-family units

HOUSE BUILDING booms are getting bigger.

That's only one conclusion of a study recently completed by Dr. David Blank for the National Bureau of Economic Research. The study is titled "The Volume of Residential Construction, 1889 - 1950."

Higher, Lower—Dr. Blank discovered that not only are residential housing building booms getting bigger, but the troughs of nonbuilding years are getting deeper (see the chart).

As for costs, the average amount spent in current dollars per private nonfarm dwelling unit has quadrupled over the past sixty years—from about $2200 in the 1890s to about $8500 in 1950. That reflects the rise in construction costs, says Dr. Blank.

Real Decline—Taking such construction price changes out of the picture shows the average expenditure per unit has declined by about 40 per cent since 1889—from an average of about $6000 to about $3600 for the last decade.

Two factors account for much of this drop. One is a reversal since the early 1930s of the previous trend to two-family or multifamily units. Since the early 30s single-family units have accounted for a larger proportion of the total starts than at any time since 1900. The proportion of two-family houses has dropped to minor importance.

More Units, Less Money—Then, too, expenditures for nonhousekeeping residential units — motor courts, tourist cabins, vacation cottages—have declined in importance since the 1920-29 decade relative to spending for housekeeping dwelling units. This latter shift occurred because constuction cost per space unit is much cheaper than large unit construction such as hotels. If this trend continues it will require a tremendous increase in construction volume to push expenditures up to the levels of the 1920s.

Chrysler Gets $250-Million Loan

A $250-million loan from Prudential Insurance Co. of America to finance further expansion and modernization of facilities and to provide additional working capital is announced by L. L. Colbert, Chrysler Corp. president.

Expenditures exceeding $450 million since the end of World War II have already increased Chrysler floor space more than 90 per cent and upped vehicle capacity more than one-third. But the increased sales volume, growth of automation and return to more competitive conditions make desirable the employment of additional funds.

Prominent on the list of facilities to be modernized are expected to be the Briggs body plants recently purchased by Chrysler, though specific details of disposition of the funds are not announced.

Proceeds of the loan are to be received by Chrysler in installments over a 3-year period commencing July 1, 1954. Any time after Jan. 1, 1962, the 100-year notes can be converted by either party into 20-year notes with equal sinking fund payments and with reduced interest rates. Chrysler Corp. in any one year also has the privilege of repaying out of its own funds up to one-fifth of the total borrowed.

Electrical Sales at Peak

The two big electric equipment manufacturers — Westinghouse Electric Corp. and General Electric Co.—rang up record dollar sales in 1953.

Westinghouse had net sales of $1,582,047,000, up 9 per cent from 1952. Net income also rose to $74,322,000 for a 4.7 per cent increase above 1952.

GE reports sales of $3,128,127,000, a 19 per cent rise over 1952; net income was $165,728,000, up 9 per cent from 1952.

All major product groups of both companies shared in the rise.

For the future, Westinghouse

sident Gwilym A. Price says: We are planning for and aiming ard larger billings and profits the coming year."

ter Census Facts Urged

ou'll have more facts quick- on which to base business de- ons if even a few of the 51 rec- mendations to strengthen the t-finding program of the Bu- u of the Census are imple- nted.

ust completed is a report by Intensive Review Committee, ded by Ralph J. Watkins, di- tor of Research for Dun & dstreet Inc.

The Proposals—The group rec- mends that complete censuses of nufacturers and mineral indus- es and of retail, wholesale and vice trades be taken as soon as sible; that no additional funds requested for a transportation sus pending further review; t a complete census of agri- ture be taken for 1954; and that complete census of state and al governments be taken in 1956 ering 1955.

n addition, the committee rec- mends that the current statis- s program be strengthened, par- ularly the current population vey and the foreign trade sta- tics. It also suggests that cur- t data on housing and construc- n be improved or developed with rticular reference to repair and abilitation of residential prop- ies.

For Industry — It recommends t the complete census of manu- ctures, scheduled for 1954 on 53 data, be taken in 1955 on 1954 ta and continued thereafter on e original five year basis. Es- nated cost: About $3.8 million. It also favors continuing and engthening the annual survey of anufactures to bridge the gap tween the complete censuses. nual cost: About $300,000. In dition it wants maximum use of formation from tax returns to e Internal Revenue Service and e Bureau of Old-Age & Survi- rs Insurance.

The committee believes there has en attrition and erosion in cen- s programs over a period of ars because of neglect.

Hope for Reduced Corporate Tax Dies

House Ways & Means Committee completes tax structure revision. Excise tax revisions include many reductions. Income tax proposal threatens over-all program

INDUSTRY'S HOPES for even a 2-per-cent reduction in corporate taxes virtually vanished last week. The House Ways & Means Committee voted 22 to 2 to maintain the present 52-per-cent rate instead of permitting the scheduled Apr. 1 drop to 47 per cent to become effective.

Chairman Dan Reed (Rep., N. Y.) said the decision would increase revenue in fiscal 1955 by about $1.2 billion and by $2 billion when fully effective. Senate action could change the House committee's recommendation, but the possibility is considered remote. President Eisenhower, too, has requested that the current rate be maintained.

House Action—The corporate tax rate and excise tax system were the last to be completed in the committee's tax system revisions, the first major overhaul in 80 years. (For the other 10 major revisions, see STEEL, Feb. 22, p. 51.) Representative Reed's bill is expected to come up this week.

In the excise system, the committee recommends retaining the present rate on distilled spirits, beer, wine, cigarettes, gasoline and automobiles. Reductions to 10 per cent are asked on luggage, furs, jewelry, toilet articles, admissions, electric light bulbs, photography equipment, mechanical pens, pencils and lighters, local and long distance telephone calls, transportation of persons, telegrams and sporting goods, effective Apr. 1.

A Threat—One obstacle looming as a threat to enactment of the House committee's tax revisions is a proposal by Sen. Walter F. George (Dem., Ga.) to increase personal income tax exemptions to $800 this year and $1000 in subsequent years. Previously chairman of the Senate Finance Committee, Senator George believes Representative Reed's revisions should be reserved for action at a time when business outlook is more favorable than at present.

He regards his proposal as a business booster, because it is a means of increasing the amount of spending by the public. The Treasury estimates that the proposal would reduce revenue by $4.5 billion this year.

Veto Hint—The President has expressed his opposition to increasing personal income tax exemptions, and Treasury Secretary George Humphrey says he'll recommend presidential veto of any bill to increase them.

M-C&S Controls Newport Steel

Merritt-Chapman & Scott, a New York construction company, has acquired through an exchange of shares a 77 per cent interest in the Newport Steel Corp. of Newport, Ky.

Newport Steel will operate as a majority-owned subsidiary pending possible acceptance by its remaining shareholders of the construction firm's offer to exchange one share of M-C&S common stock for each 2.1 shares of Newport Steel. The offer continues through Mar. 27.

The acquisition of a controlling interest in Newport Steel follows M-C&S's purchase last November of the Milton Electric Steel Corp. of Milton, Pa. Both purchases were made to provide diversification in M-C&S operations, which includes marine salvage and derrick heavy hoist activities in addition to construction. Although some use may be made of Newport products in M-C&S construction projects, present plans are to continue to sell Newport's output in its present market. Newport plants have a rated annual ingot capacity of approximately 709,000 net tons and have facilities to convert this production into a wide range of hot rolled products. A mill for cold rolling steel is now under construction.

Utah Radio Products Inc., a wholly owned subsidiary of Newport Steel, manufactures radio and television cabinets and parts and electronic equipment.

New Avenue to Industrial Development

Rand Development Corp., Cleveland, is a small firm with a big idea—perform industry's development work on a short-term basis. It's paying off for both Rand and industry

WHAT would you do if you had the problem of developing a new product such as a power-driven, overhead door for garages that could be retailed for less than $100?

Because there are so many such companies that have equally perplexing problems and who want quick service, H. J. Rand, Cleveland, hit upon the idea of forming an organization several years ago that would specialize in development of new and improved products and processes.

Growing—That Mr. Rand was right in gaging the need for such services is attested to by a move now to incorporate as the Rand Development Corp. and expand facilities. The new company is making a $1-million-plus stock offering.

How does Rand Development operate? It develops an idea or process to the commercial level, turns it over to a commercial company in return for a fee, often a small royalty. Grist for the Rand Development idea-mill comes from three sources: Problems presented through consulting work, internally developed ideas and over-the-transom ideas brought in by independent inventors.

Proof of the Pudding — More proof that the Rand Development approach to industrial development is paying off for industry is the long list of its products already in use or out of the development stage: The Bendix Economat washing machine, incorporating a simpler drying principle; Milium cloth, a heat-reflecting material that makes warmer, lighter-weight cloth products possible through control of radiant heat; a helical pump with oscillating impeller; a low-cost, fool-proof, power-driven overhead door, controlled by a photomultiplier tube that recognizes light impulses only and won't react to stray light or radio waves; a brand new washer-dryer combination.

Among his firm's biggest assets, believes Mr. Rand, is the fact that it's not so close to industry's problems but what it can see a fresh approach. "An outsider can be helpful because he brings an open mind to the problem and can take

H. J. RAND
. . . fresh approach to development

time to work out a solution." More and more companies, particularly smaller firms, are turning to these outside sources with their development problems.

What's with Wire?—But large firms also come to Rand engineers for help. For a large steel company, for example, researchers at Rand have listened to wire being drawn until they can tell by sound whether it's drawing properly or not—and if not, just what is going wrong. Now Rand engineers are developing instrumentation by which even a comparatively inexperienced operator will be able to tell the same things. Rand Development has found, too, that the lubricants in fine wire drawing actually function as coolants. That will eventually lead to the proper lubricants to prolong die life.

Coming Soon—Among the ideas which Rand Development has come up with entirely on its own, two are of particular interest to metalworking. One is a new carbon mold for foundry use which can be held to close tolerances and reused for an indefinite number of castings. It produces castings with a polished surface and is recoverable when the original mold is no longer serviceable. The other is the "Magic Seal" valve for industrial use which, instead of closing on a valve seat, closes against the side of a bore and closes in the direction of the flow of air or liquid. Rand engineers also are working on a process for making high temperature parts. The process promises to maintain such accurate dimensions in the parts that need for a lot of grinding or sizing operations will be eliminated.

Rand Development staff numbers 25 men—assorted chemists, metallurgists, physicists and just plain, practical shop men. "We don't want a big staff that will increase the temptation to hold onto a job long after we've ceased to give anything to it just to keep our men busy," says Mr. Rand. When special, limited problems require expert advice, Rand Development is not averse to going to outside agencies, such as Case Institute of Technology or Battelle Memorial Institute, for assistance.

Ford Atoms Test Ores

Experiment indicates need for further research into the way iron particles adhere

FORD MOTOR CO. scientists believe that the results of a recent experiment may point the way to a better method of using low-grade iron ore concentrates. Indications are that further research is needed into the way that iron particles adhere.

Old Belief Proved—The test was made to determine the feasibility of blast furnace charges using fine iron powders obtained by concentrating low-grade ore. The steel industry heretofore has assumed it is necessary to form these powders into lumps because they were too light to withstand the draft long enough to melt into iron. The Ford research men confirmed this belief with evidence that only about 60 per cent of the

cles were retained during the ting process.

making the test, the research used 76 tons of radioactively ged" material. Ford believes is the largest quantity of oactive material ever involved n industrial experiment.

ork Began Months Ago—The e objective of the analysis was ind the amount of material ally smelted into iron com- d with that expelled and trap- in the dust collection system. parations began seven months when a five-pound lot of dered iron ore concentrate was ded inside an aluminum con- er and sent to Oak Ridge, n. There it was bombarded neutron rays for eight days a reaction pile, then blended 22 tons of identical iron pow- Finally, 54 tons of a second of iron ore were added.

y measuring the radioactivity he pig iron, slag and expelled , engineers were able to de- nine the percentage of iron der which had actually re- ned in the furnace.

nour Projects Hit $10 Million

lore than $10 million worth of earch for industry and govern- t was carried out last year by Armour Research Foundation the Illinois Institute of Tech- ogy, an independent, nonprofit earch organization.

Work was done on 467 different earch projects, 70 more than in 2. The foundation does research ceramics, chemistry, electrical ineering, heat-power, dynamics, tals, physics, propulsion and re- ed fields.

Armour research projects have ulted in a method for recover- manganese from open-hearth g, an improved automatic head- nt dimmer, a lightweight ceramic lding block, a longer lasting tin and new alloys for jet aircraft.

e largest industry-sponsored ject undertaken in 1953 was a dy of how to reduce the number railroad freight car hot boxes.

e foundation has also expanded computer center, which is avail- e to firms and individuals who ed such equipment for the rapid ution of complex mathematical blems.

Weather Aids Plane Builders

Recent spring-like weather along the East Coast is helping speed delivery of Republic F-84F Thunderstreaks to the U. S. and allied air forces. To boost production, this outdoor assembly line has been set up at Farmingdale, L. I.

U.S. Puts on More Pressure To Birthmark Metals

THE U.S. IS TAKING the bull by the horns and applying economic pressure to encourage steel and nonferrous mill operators to mark their products so that they may be identified as to composition in consumers' inventories.

Last week one mill lost out on a good sized Air Force contract for galvanized sheet, and another mill failed to get an order from the same service. In both cases, the mills lost out because they were not equipped to mark steel.

To Another—The orders went to two warehouses provided with marking equipment. Look for the Navy and Army to follow a similar course of giving preference to mill suppliers who will mark the product at the mill. In all cases, the government will pay the extra cost of marking, as long as the charge is reasonable.

As an additional incentive, the Office of Defense Mobilization has decided to consider accelerated amortization on investments for marking equipment and will act favorably if and when applications begin to be received. This is part of ODM's "continuity of production" program which calls for the marking of mill products so that they can be identified in inventories following bombing attacks. The Defense department also continues to work on a contract calling for mandatory marking.

NLRB Tightens Severance Rule

Under a decision handed down last week, the National Labor Relations Board will not extend its previous policy exempting whole industries from craft union severance. Such exemptions had been granted by the old board in the case of four basic industries: Steel, basic aluminum, lumber and pulp. They will continue to hold. The new rule reads: "A craft group will be appropriate for severance purposes in cases where a true craft group is sought and where, in addition, the union seeking to represent it is one which traditionally represents that craft."

The ruling was made in a case involving the Trona, Calif., plant of American Potash & Chemical Co. Decision is in line with policies of the CIO, the Manufacturing Chemists Association, the National Association of Manufacturers and the U. S. Chamber of Commerce.

Federal Salaries: Comparable to Private Pay Except for Top Men

WHAT SALARIES and wages does the federal government pay its employees—and is it true that the government pays less than private industry?

The question is timely right now in view of proposals being considered by Congress to raise pay of congressmen, the federal judiciary, and such employees as mailmen, clerks, stenographers and the like.

The number of employees who are paid less than private industry scales is relatively small and is confined largely to top jobs; men like Secretaries Charles E. Wilson, George M. Humphrey and Sinclair Weeks at the cabinet salary of $22,500 come to the government service at a substantial financial sacrifice. This also is true of such men as Undersecretary Marion B. Folsom, Undersecretary Walter Williams and other undersecretaries who work for the government at $17,500. It is true of the secretaries of the Army, Navy and Air Force who get $18,000. It is true of some of the assistant secretaries, who draw $15,000. It also is true of some of the lawyers in government who got more in private practice.

But otherwise, for the overwhelming majority of government employees, the pay compares quite favorably with compensation paid by private industry for comparable services. In addition, government employees enjoy certain benefits that employees in private industry do not in all cases receive. All government workers are entitled to 13 days' sick leave without loss of pay. Employees with less than 3 years' service are given vacations of 13 working days in addition without loss of pay; that means two weeks plus three days. Those with 3 to 15 years' service get 20 days and those with more than 15 years get 26 days. In addition, all government workers are covered with a pension system with variations covering retirement at 55, 60 and 62, also retirement for disability.

Half in Civil Service . . .

Substantially 50 per cent of government employees come under the Civil Service System with pay fixed by grades. The other 50 per cent

covers mailmen, TVA and AEC workers, machinists at Navy yards and Army arsenals and so on, whose pay is fixed by separate statutes, or set on the basis of the prevailing wage rates in the area.

For administrators of agencies such as Business and Defense Services Administration, Small Business Administration and the many others the salary is $15,000. This is the rate also for assistant secretaries of Commerce, Defense, etc. After that, other employees fall into the 18 Civil Service classifications, ranging from $2500 for Grade 1 to $14,800 for Grade 18, and from $1810 to $4565 for CPA jobs—that is, Crafts, Protective and Custodial jobs.

Generally, those industry me who work for the BDSA, for exam ple, are there on a rotating bas and are known as "WOC's"—mean ing that they are on leave fro their companies and work witho pay by the government. But man industry men leave their jobs i private enterprise and throw i their lot with the governmen When they do that they usuall serve as assistant administrator advisers, division directors, branc or section chiefs, industrial spe cialists, consultants, metallurgist technologists and with other title of this type.

The pay they receive depends o their grade classification.

Grades 16, 17 and 18 are know as the "super" grades. Grade 1 carries salary of $14,800. Grad 17 pays $13,000 to $13,800, th spread allowing for promotion within the grade. Grade 16 pay $12,000 to $12,800, and so on.

Congress Seeks Boost . . .

Pay of congressmen now is $15 000, and it is rather amusing t observe the coy maneuvers of th many legislators who would lik the raise recommended recently b the Commission on Judicial an Congressional Salaries but wh think it would be bad politics t approve it in toto. The commi sion recommended that Vice Pres dent Nixon and Speaker Martin b upped from $30,000 to $40,000 an that senators and representative be raised from the present $15,00 to $27,500. And that isn't all; th legislators would be provided wit a voucher authorization unde which the government would pa some of their major expenses.

Some officials in high federa offices point out the sacr fices they are making in workin for the government. The test mony of Bolitha J. Laws, chi justice, United States Court f the District of Columbia, was i teresting. Judge Laws gets $15 500 and he said that on account his living expenses his capital ha declined by $40,000 since he b came judge in 1938. Under the co mission's proposal his pay wou be upped to $27,500.

SO This Is "HOT" ROLLING

he bitter cold of Winter is no deterrent the accurate rolling of a wide range of ducts on this Morgan Merchant and Strip ll. Arranged for maximum flexibility, this dern continuous mill maintains high tonnage duction of much needed bar and strip steel for major Canadian steelmaker. Sound engineer- based on years of experience, yet employ- g the newest ideas and techniques, is assur- nce that Morgan Continuous Rolling Mills will always meet the most exacting require- ments of mill operators from Sault Ste. Marie, Ontario, Canada to Jamshedpur, India; from Mo-I-Rana, Norway to Newcastle, NSW. Australia.

RM-59

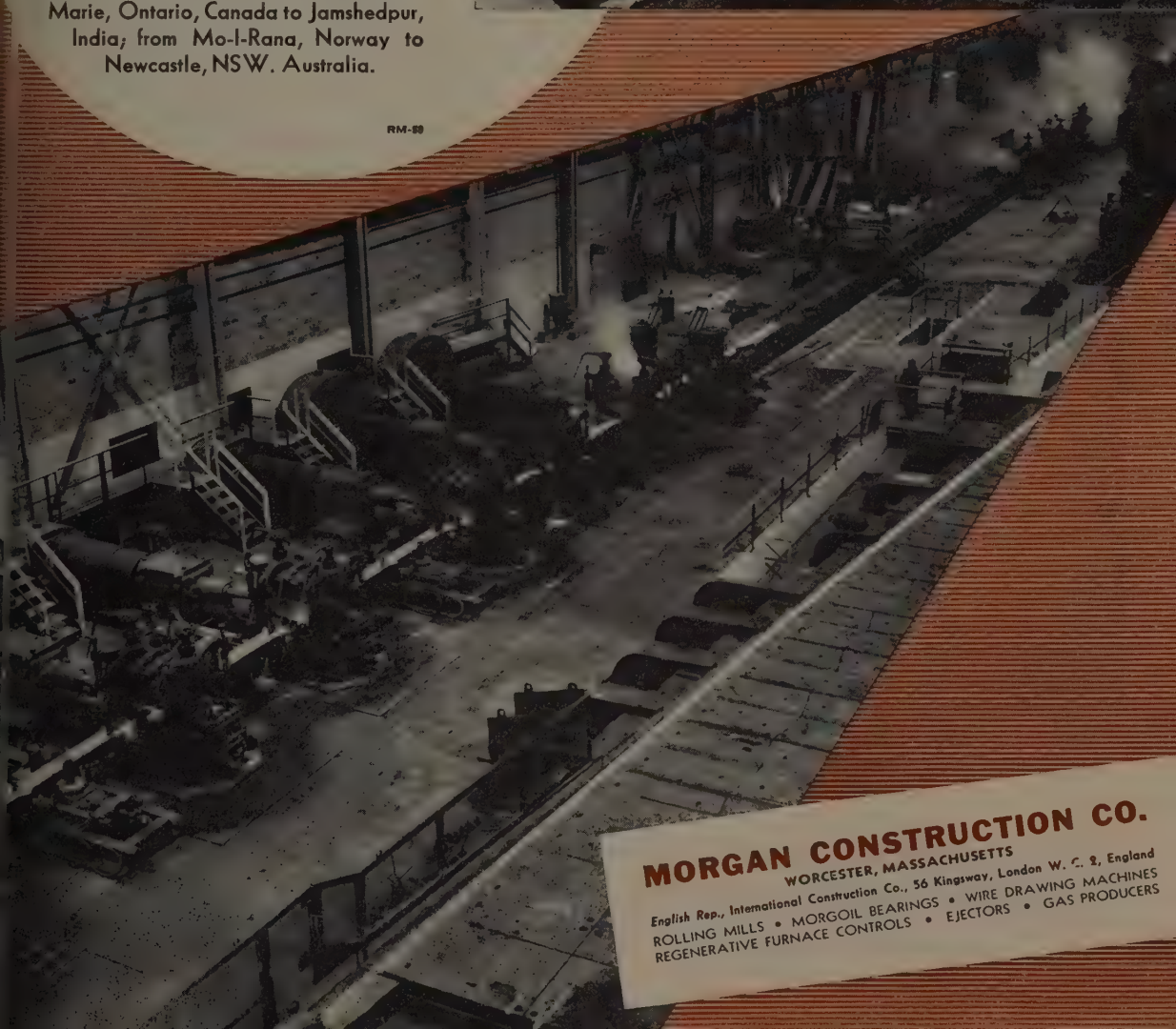


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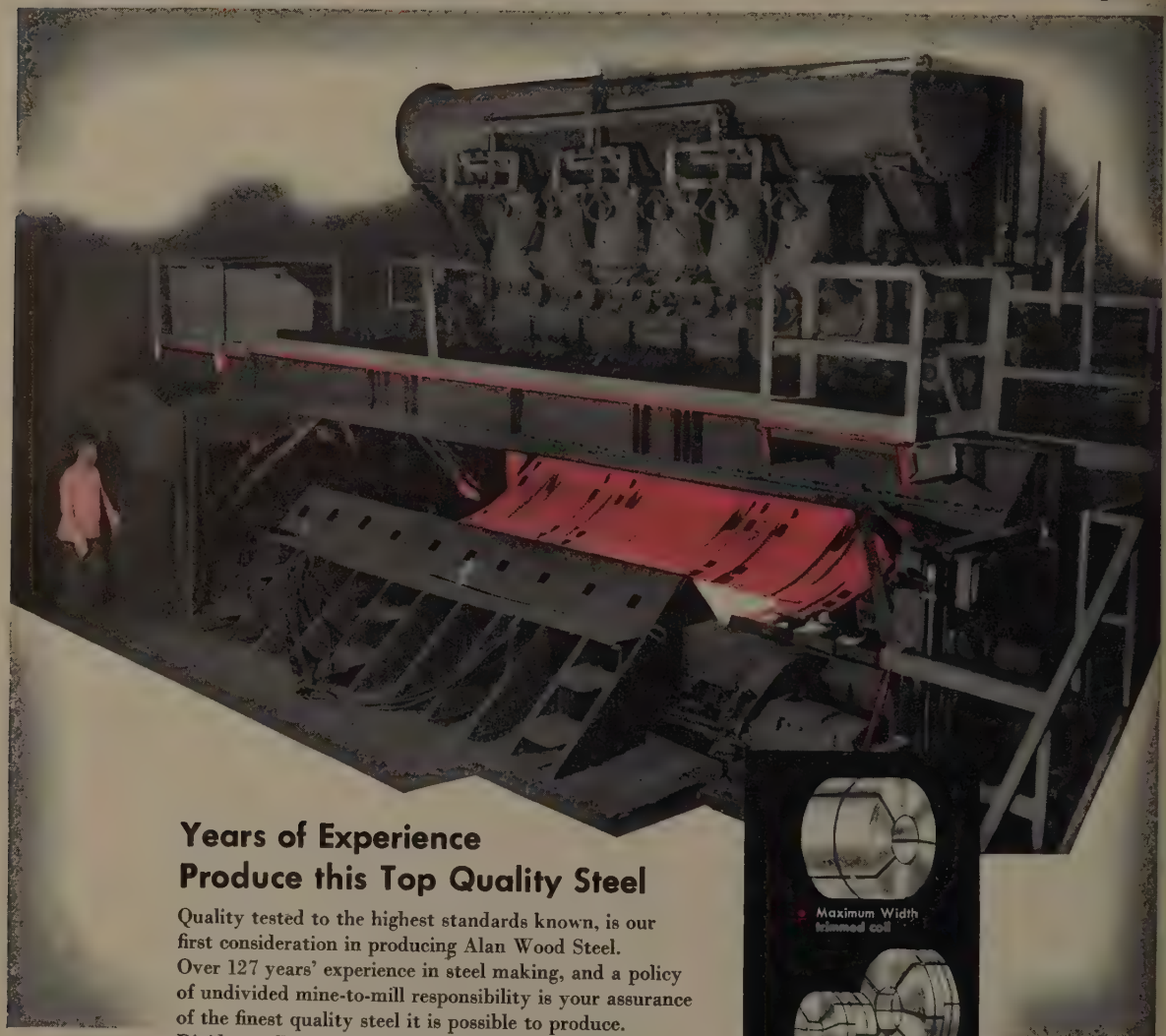
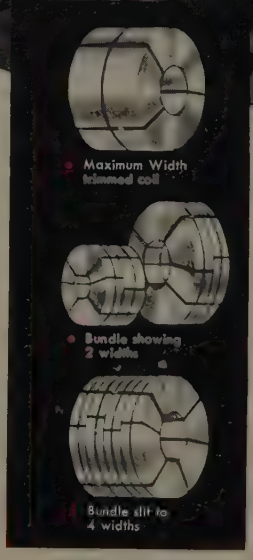
PLATE • SHEET • STRIP—*available in hot rolled quality*



Years of Experience Produce this Top Quality Steel

Quality tested to the highest standards known, is our first consideration in producing Alan Wood Steel. Over 127 years' experience in steel making, and a policy of undivided mine-to-mill responsibility is your assurance of the finest quality steel it is possible to produce. Rigid metallurgical control throughout production is your guarantee of getting *exactly what you want.* Our Continuous Mill produces steel from .059″ to .500″ —to a maximum width 25½ inches.

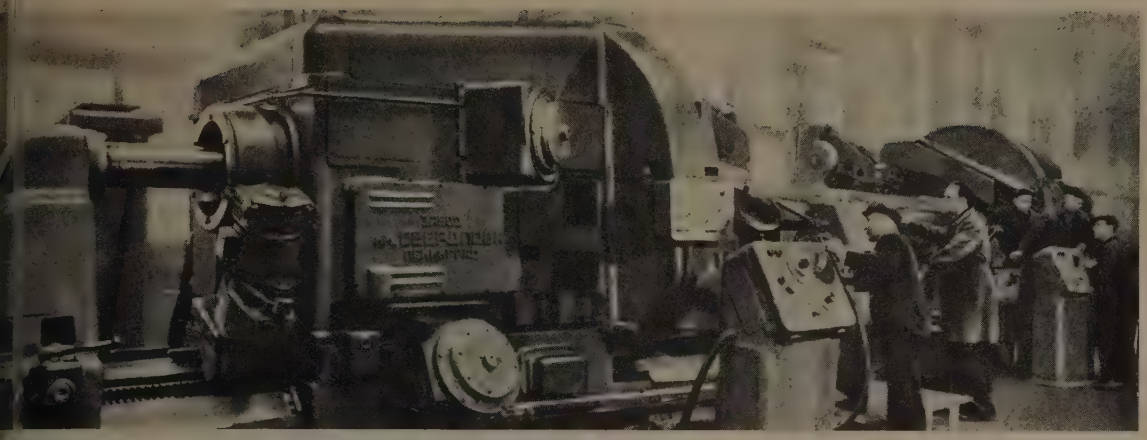
Alan Wood's Delaware Valley location . . . hub of the East's giant industrial and transportation area also means faster deliveries.



More than a century and a quarter of iron and steel making experience

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.



ig-Size Machine Tool of Modern Russian Design

u an machine-building progress is illustrated by this p al lathe designed for machining large turbine blades for hydroelectric plant installations. The lathe, built by Sverdlov Lathe Building Works, Leningrad, is 49 feet long

mpy Road to Russian Steel Output

Reports in the back pages of *Pravda*, official Russian newspaper, tell of dislocations in U.S.S.R. steel industry. Management and foremen are the choice targets

REPORTS in the official Rus- newspaper, *Pravda,* are true, h road to increased iron and t l output in Russia is far from m oth.

ront pages of *Pravda* carry re- s of increased production, but h inside pages hold stories of m gness among plant directors w o often tolerate serious in- q quacies in organizational-tech- n l management." Another com- n complaint in the back-page st ies is that many shop foremen ex t insufficient control over pl t activity and fail to establish pr erly production procedures.

o Foresight—Particular cases a cited. The Seversky plant m agement issued a decree order- r inactivation of the billet de- p tment's No. 2 soaking pit for re airs but made no preparations fo the repairs. So the job took 4 days instead of the normal 19 d s.

t the Voroshilovsk plant, there w s a shortage of casting molds a "the main administration of th metallurgical industry has not m ed in securing casting molds fo the plant," says *Pravda.* "This le ds to keeping the metal in the f naces too long and complicates t work of the steel founders."

More Coal Please — Another *Pravda* report says that a number of steel plants, particularly those at Magnitogorsk and Chelyabinsk, have failed to stockpile sufficient coal and ore to last the winter. The newspaper goes on to charge that much of the coking coal actually delivered is not of coking quality.

"Unrhythmic production" remains a serious problem in the machinery building industry. Output is extremely low during the first third of each month and rises sharply during the last 10 days as workers attempt to make their monthly output quotas. As a result, the newspaper says, machine tools and presses are not used at anywhere near their capacities for the month as a whole.

Bumps for Management — Thus far "socialist competition" has kept Russian steel output rising. U.S.S.R. claims steel production of 41 million tons in 1953, 10 per cent above the 38 million tons of 1952 which in turn was 10 per cent above the 35 million tons produced in 1951. Pig iron output rose about 10 per cent to 30.8 million tons in 1953 from 27.7 million tons in 1952. It seems these increases have not been accomplished without considerable bumps in the road, however. And from the *Pravda* reports, most of the bumps are directed at plant managers and foremen.

Export Controls Eased

Exporters can now ship over 75 additional types of industrial machines and parts to Western Hemisphere countries without applying for an individual export license, says Commerce department's Bureau of Foreign Commerce.

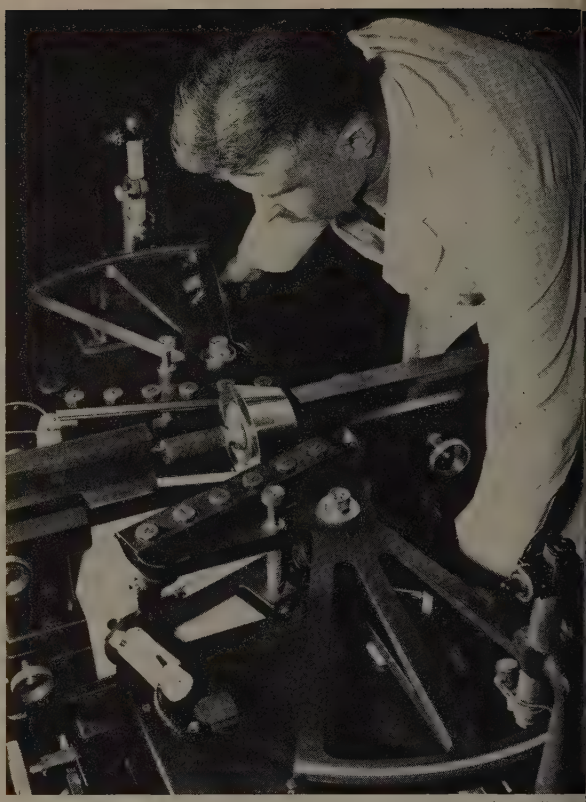
The relaxation applies to certain types of steam turbines and steam generators; kerosene tractor engines over 10 hp.; power excavators and dredging machines; concrete pavers and mixers; graders, jacks and cranes; industrial trucks, tractors and parts; specialized mining machinery; air conditioning and refrigerating equipment; textile machinery; heat exchangers; and various specialized types of machinery.

U.K. Steel Output High

Great Britain's steel output continues to rack up new records. The weekly production average for January, 1954, was 396,330 tons compared with 380,930 tons a year earlier.

But, it's doubtful that the high production rate can be sustained, though, because much of this output is against backlogs, and new orders are well below year-ago levels. Pig iron output of 229,600 tons a week was also at a higher rate than in any previous month.

Research and Development Keep Scientific Apparatus Manufacturers Busy



Timken Roller Be

Scientific Apparatus*

Sales Still High

1954 (est.)	$200 million
1953	$211 million
Laboratory apparatus	132 million
Optical instruments	13 million
Industrial instruments	66 million
1952	$200 million
1951	$167 million
1950	$122 million

* Except recorder-controller sales

INTENSIFIED RESEARCH and development programs projected for 1954 mean another good year for scientific apparatus manufacturers.

Sales could surpass the 1953 performance, but will probably slip off about 5 per cent from the 1953 level (see table above).

Bolsters—But even with a 5-percent drop, apparatus makers will still do better than most of industry. That's because of the competition-spurred increase in research and development, both to introduce new or improved products and to improve manufacturing efficiency. During each of the past two years, the nation has spent about $3.5 billion on research and development. Even more will be directed that way this year. Nearly half of the investment will come from private industry, especially for the electronic and instrument segment of the apparatus industry.

Laboratory apparatus, optical instruments and industrial instruments combined showed a sales increase of 5.5 per cent in 1953, although the optical group slipped off 15 per cent as a result of competition from imports. Imports are likely to hurt it again this year.

The recorder-controller section of the Scientific Apparatus Makers Association reports that 1953 business was 6 per cent lower than in 1952, and an anticipated further drop of from 4 to 5 per cent can be anticipated this year. What happens depends upon such industries as public utilities and petroleum. Already there have been some cutbacks in buying by the steel and process industries.

Big Field—Scientific apparatus is manufactured by some 1600 companies, many of which employ less than 25 workers. These firms make more than 20,000 different types of apparatus.

Deliveries today are the best in many months, being fairly current for main lines.

Drama — Among best selling items is load cell weighing equipment which is finding wider use in process industries. This is electronic and is a new concept in determining mass-weight. It could show dramatic sales increases in the next few years. Then too, there is more use of large analytical instruments which are automatic in operation. Microscopes and analytical balances continue to be big business.

Atomic energy installations a many subcontractors contribut to the program combine to p vide a major customer for the s entific apparatus industry. This expected to continue. Of much portance currently are industr remodeling programs.

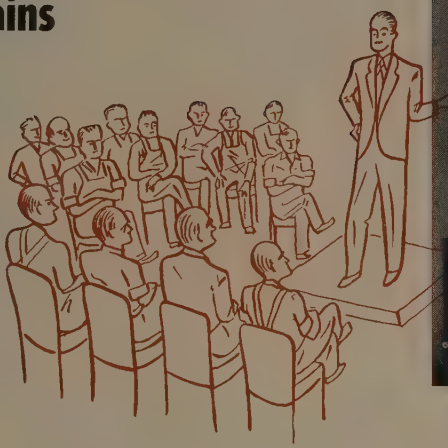
Trouble Abroad—The industr major problem is that of impo particularly in the category of tical instruments, precision l ances, and the like. The Scient Apparatus Makers Association December submitted a statem for consideration of the Comm sion on Foreign Economic Pol

SAMA recommended: That seven-man independent commiss be appointed by the President w power to control importation p duced by indispensable indust necessary to our national defen and that an extraordinary cla fication of industrial operations dispensable to national defense established or maintained with undue curtailment due to impo

Worried—The commission's port of January contained no p visions along the lines reques

:VERSE SELLING

For Long-Term Gains



eat Lakes Carbon's customer ication shows shop-level n how to use fewer elec- des more efficiently. The a: To further the electric el industry so it will be a ter long-pull market

U don't often hear a supplier ing his customers how to use of his product. But that's es- tially what Great Lakes Car- n Corp., Niagara Falls, N. Y., doing with a customer educa- n program on arc furnace elec- des.

The program is for the men on e melting floor who actually estle with the electrodes. Great kes, naturally, has had little uble selling the program to its stomers' management.

Makes Sense—"Here's the way look at it," explains S. H. Rey- lds, GLC's electrode division les manager. "By helping the im- rtant men—the men on the floor understand the 'why' of proper ectrode care and handling we n contribute to the lowering of ectric steel costs. This, in turn, ould further the growth of that dustry, thus ultimately increasing e market for electrodes".

Great Lakes takes the long- nge view that it is better to sell extra carload of electrodes be- use a customer has added an- ther furnace, than because he is etting less-than-optimum service ut of his existing equipment.

Creating the Program — Great akes took its ideas to consultant Villiam Exton in New York, whose ob it became to produce the final olished version, complete with vis- al aids and demonstrators. He came up with a three-session program that is both informative and question-provoking. Next step: Get customer reaction.

To do this, GLC first asks permission to present a capsulized version of the entire course to supervisory men for their opinions on the program's worth to the men under them. This takes about an hour and serves to bring out points that should be stressed in a particular shop and also helps the instructor tailor his remarks to local operating practice when the course is given to the men.

Company Pays—If the customer decides he wants the course given, (and all have, up to this date) he sets the time, decides who will attend and assumes the overtime cost in wages. Schedules usually allow for a month between sessions to give the men time to discuss the points among themselves and develop additional questions to be asked at the next meeting.

In practically every case, attendance at the last two sessions of the program is considerably greater than that of the first meeting. Company officials report they get more volunteer pupils after the program gets talked up in shop bull sessions.

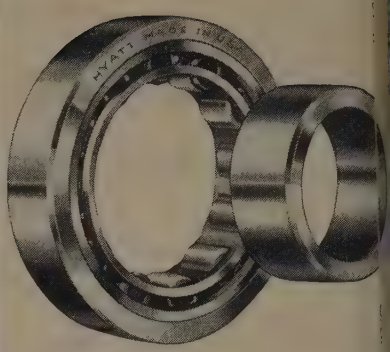
Double Payoff — In addition to electrode savings, companies report considerable improvement in worker attitude. One eastern shop had experienced considerable resistance to its efforts to improve shop practice in general. After the educational sessions, the men took an active interest in the efficiency program and seemed to understand the reasons behind it.

Improvement of the worker's attitude, while not a prime goal in this program, was a calculated consideration when the course was created. As Consultant Exton puts it, "You can't add to a man's job understanding without adding some dignity to the job itself."

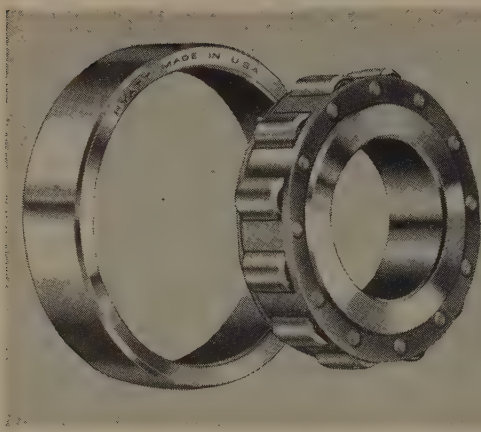
More of It — A meltshop superintendent in a Midwest plant confessed that he would like to see more of his suppliers come up with programs of this kind. He says, "Now that production is back on a normal work week, we've been holding classes every Saturday for the furnace men. Frankly, I believe the suppliers could do a better job of preparing and presenting programs of this kind than we can."

Great Lakes has several teams of men equipped to put on the program. They have covered some fifteen users of electric furnaces to date and are rapidly filling their schedule as the word travels around the industry. Already there is some talk about adding another session or two to cover topics suggested by some of the furnace operators who have taken the Great Lakes course.

3 ways to handle your RADIAL LOAD PROBLEM

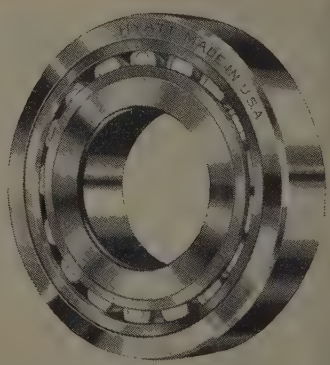


1 If your design requires a large shaft diameter to produce greater rigidity without disturbing boundary dimensions, a separable inner race type Hyatt Hy-Load bearing can be used with the inner race omitted. Rollers operate directly on a suitable hardened and ground shaft.



2 When the housing bore must be kept to a minimum, a Hyatt Hy-Load bearing with a separable outer race can be used—with the outer race omitted. The rollers then operate directly in a housing bore of suitable hardness and finish.

If your design applications involve radial loads, the best way to handle the job is with Hyatts—for Hyatt offers industry's most complete line of straight radial roller bearings! Hyatt Hy-Loads, for example, are made in three diameter series and two basic widths, to standard dimensions. There are ten major types—for the heaviest radial loads, and light or intermittent thrust loads. Four have separable inner races, two have separable outer races and four are non-separable, thus permitting wide flexibility in design and assembly procedures. Write for our general catalog No. 150—it will put the solution to any roller bearing problem at your fingertips. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.



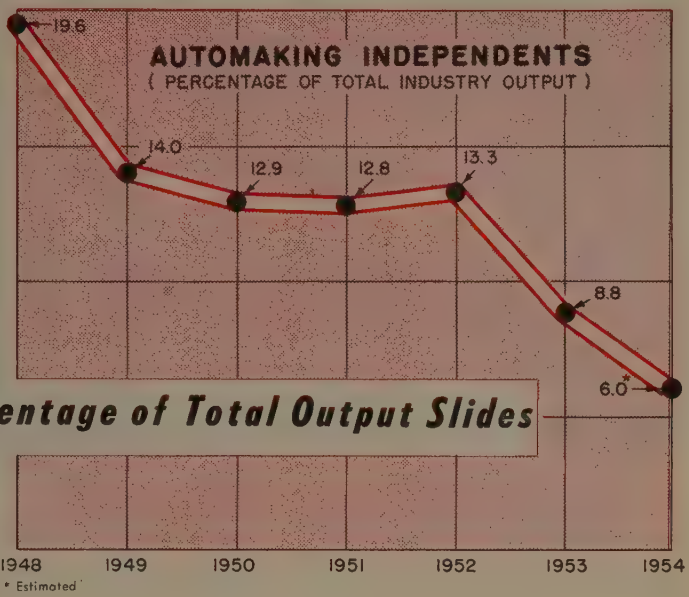
3 For designs requiring a bearing installed as a unit, there is the non-separable type of Hyatt Hy-Load. Whether you select a separable or non-separable type of Hyatt Hy-Load, they are available in a wide range of sizes.

HYATT ROLLER BEARINGS

STRAIGHT BARREL TAPER

ndependents Drive To Solve Their Problems

... As Their Percentage of Total Output Slides



They have these factors to aid them: Flexibility, adaptability, speed in tooling and the ability to produce cars that are different

IT'S POPULAR right now to write off the future of the independents with "merger will out."

Certainly there is plenty of evidence to support the vogue of dire predictions. Notably manifest is the independents' sagging share of total auto output. Not only has the percentage dropped sharply since 1948 as the chart shows, but preliminary indications are for a further slump in 1954. In February the independents produced only 21,400 cars, lowest monthly production in more than seven years.

Steady Decline—You can find good underlying theoretical foundations for pessimism too. In the early days of the auto industry several hundred companies built less than 100,000 cars. Last year over 6.1 million cars were produced by only eight companies, probably to become seven. Thus the traditional pattern of the auto industry has been one of fewer and fewer companies building more and more cars. And it's significant to note over 1000 automakers have failed and even the husky Big Three all have mergers in their past.

If you look still further you will find facts behind the theory. Building big volume means big capitalization to handle big plants and big tooling. It means product diversification and market penetration and a sprawling, healthy dealer organization with salable cars at competitive prices. And when you stack up most independents' obsolete multistory buildings, waning capital and thin layer of aging management, it is evident that some steps must be taken.

Not Necessarily So—Does that mean merger? A merger is no solution if it does not strengthen the company, says James J. Nance, president of most-merger-talked-about Packard. "A merger must accomplish something both in manufacturing and marketing to be worthwhile," he says, "and to be successful it must have healthy components."

And although building up Packard's health is the prime Nance project, he regards merger not only as something aside but entirely unnecessary to survival. A healthy Packard might find merger a worthwhile step to further health. Or quite possibly it might not.

Liability?—For a ring on the finger can turn out to be a ring through the nose in the auto business too, because it may threaten the biggest single advantage an independent enjoys—the ability to move fast. Close liaison between small departments means quick decisions and the elimination of red tape that can snarl ideas in larger auto firms.

Although the smaller staffs in themselves mean considerable savings in overhead, most striking is the fact that developments can be perfected in a matter of months that would take large departments years. It is possible for model plans to be finalized quicker than those of the Big Three.

Co-ordination — That's because the flexibility extends into manufacturing. Production men work

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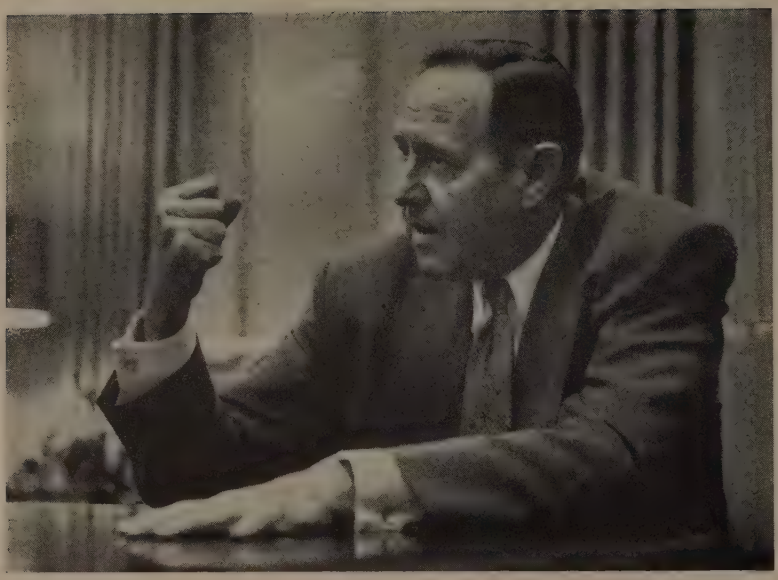


"The key is efficiency, not necessarily expansion."

hand in hand with engineers, suggesting changes that will make the unit under development easier to manufacture almost as the lines are being drawn. Instead of traveling back and forth between engineering and manufacturing, the product comes out of incubation with tooling already well on the way.

The independents have other advantages when it comes to manufacturing. Although automation has been widely touted as adaptable only to the high volume producers, Ray P. Powers, vice president of manufacturing at Packard, points out that just as much automation is possible to the independent. "The key is time per unit. When you have a high output per hour, a deep hole in an engine block will have to be drilled in several passes because of the necessarily shorter time allowable at each station. That means more stations on the line."

Aid from Automation—He adds: "Our new engine line at Utica will be highly automated, but because we require less volume we can use the extra time to drill the hole in fewer passes. That mean fewer stations, a more compa and less expensive line and n so many of those points whe trouble can occur. Our line shoul be fundamentally more efficie than lines of many of the large companies."

By the same token, the inde pendent figures it is also competi tive on other chassis component

Vulnerable—Body tooling, how ever, is the one spot where lo volume takes its toll. That's be cause the same expensive dies cap able of upwards of 1 million piece for the competition often are use by some independents for onl about 100,000 parts. The result i proportionally higher tool cost since they are distributed over a correspondingly smaller base.

This body-tooling luxury is the top anathema of the independents but even here there are promising developments. Currently looked-for messiah, of course, is plastic dies. Made to order for the independent-class volume, runs approaching 100,000 parts are already reported for some dies with indications that the next few years should commonize the feat.

Aid from Plastics—Progressing most rapidly now are the epoxies contrasted with the earlier fair-haired phenolics. Although it appears now that only the higher-priced shapes will be in plastic with steel inserts at crucial wear points, eliminated will be much

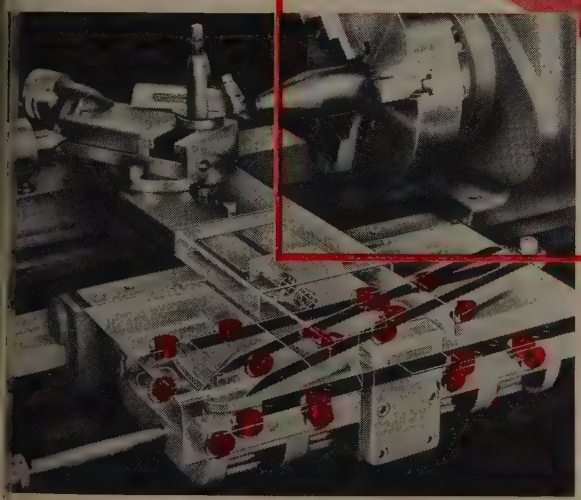
(*Please Turn to Page* 101)

WHAT ONE INDEPENDENT IS DOING

Packard Gets the Jim Nance Touch

- ☑ **Production increased to 81,341 in 1953 compared with 62,990 in 1952.**
- ☑ **Engines, transmissions and axles moved to single-story building with more modernization moves planned.**
- ☑ **Styling section expanded in new $2-million research laboratory.**
- ☑ **Research staff increased 35 per cent.**
- ☑ **Intensive new quality control program initiated.**
- ☑ **Supply channels being re-evaluated.**
- ☑ **Top executive average age 1½ years ago was 59, now 46.**
- ☑ **Supervisory retirement and pension program established.**
- ☑ **Dealer sales training schools established.**
- ☑ **Return to luxury Packard line with Clipper brought back to medium price field.**
- ☑ **Forward Planning division established.**

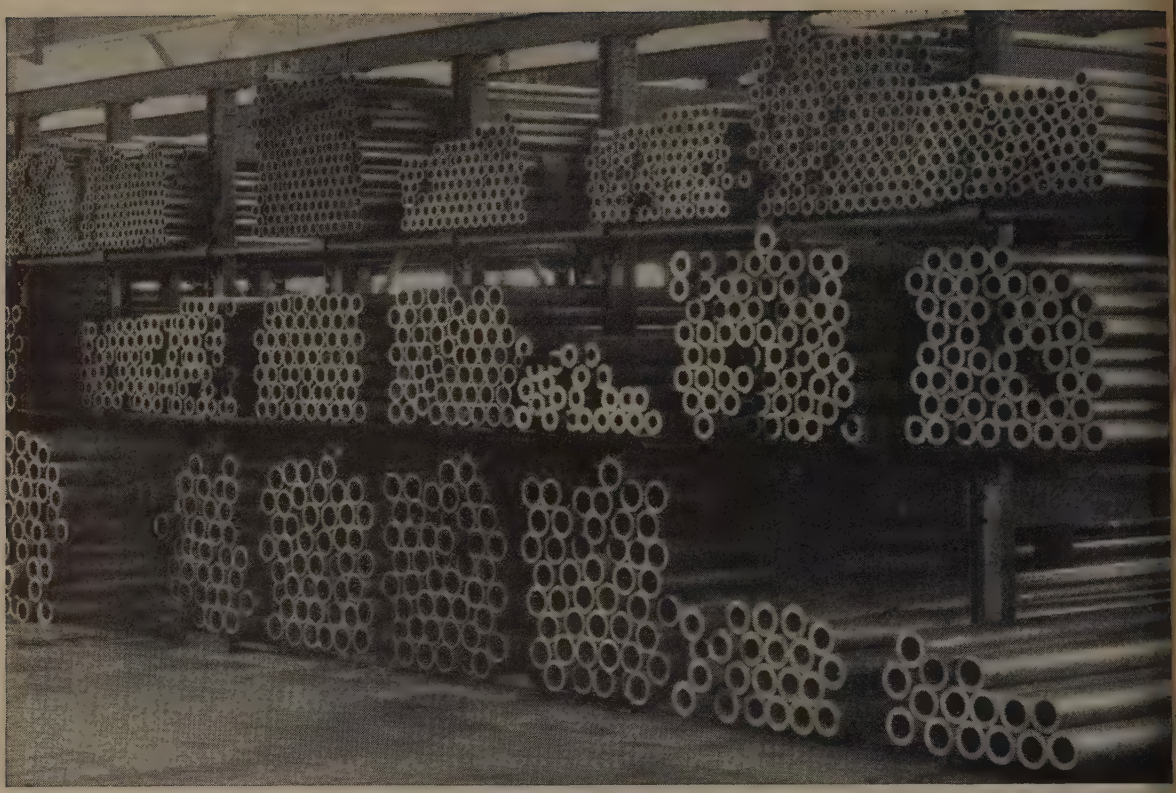
BALL EARINGS make product BETTER



Twenty New Departure ball bearings are used in the Monarch Machine Tool Company's antifriction bearing taper attachment. There are 12 single-row bearings, 8 double-row bearings. All are permanently lubricated.

Many advantages of the Monarch lathe taper attachment are—according to its maker—the result of New Departure **ball** bearings. For by their use, backlash, friction and lost motion are almost entirely eliminated . . . smoother, more accurate tapers are possible. And Monarch's taper attachment takes heavy cuts even when boring or turning acute angles, for **ball** bearings give rigid support under both radial and thrust loads.

Call your New Departure sales engineer. Have him show you how New Departure ball bearings make a good product *even better!*



What size 52100 steel tubing do you need? We'll ship tomorrow!

WE carry 101 different sizes of Timken® 52100 steel tubing in warehouse stock—from 1″ O.D. to 10½″. If you order today, we'll ship tomorrow!

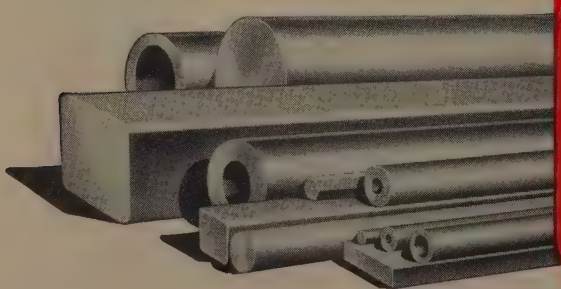
52100 is a high-carbon chromium steel that will do most of your hollow parts jobs. In moderate sections it will through-harden and it has been used in place of more expensive steels. You can heat treat it to file hardness and then temper back to any desired point.

Timken 52100 steel is ideal for hollow-parts jobs like these: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instrument parts.

The Timken Company is America's pioneer producer of 52100 tubing. We have a background of experience in making it that can't be equalled. We've developed rigid quality control procedures that check every step of the operation. Result: uniform high quality from tube to tube, heat to heat.

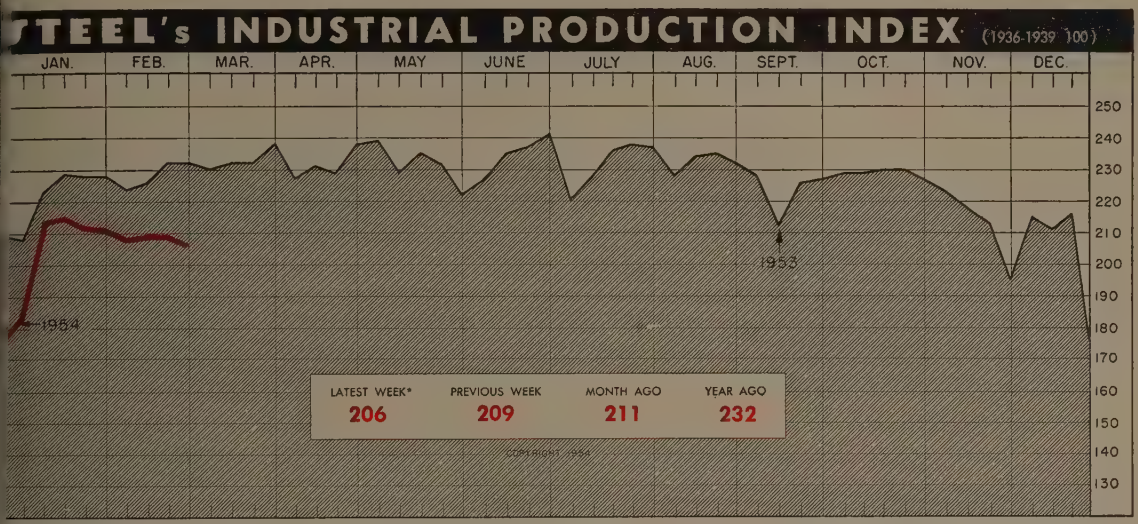
Write, wire or phone us now for immediate delivery of your less-than-mill-quantity orders of 52100. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



TIMKEN
TRADE MARK REG U S PAT OFF
Fine Alloy
STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



ended Feb. 27

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

creased Output? Borrowing Suggests an Upswing

NS of a spring upturn in busi- are increasing. For instance, mouth division of Chrysler p. reopened the second assembly at its main plant in Detroit, Norge division (refrigerators freezers) of Borg-Warner p. is operating another produc- line.

re Funds Sought . . .

o help finance the upswing, iness borrowed $13 million in latest 7-day period from the kly reporting member banks of Federal Reserve System. For first time since December (ex- ling purchases of Commodity dit certificates which banks st carry as loans) business ob- tions rose above the prior week. Metalworking manufacturers, kers of wearing apparel and the olesale and retail trade were marily responsible for the in- ase. The rise in trade loans s the first since Nov. 18.

nk Clearings High . . .

n addition to hefty payments older debts by industry and con- ners, the fast pace of retail sales helps hold bank clearings at record levels. During the latest week check clearings in 25 leading cities totaled $16,355,622,000 which Dun & Bradstreet points out was a gain of 14.7 per cent over the comparable week last year.

Bright Signal . . .

Railroad loadings of miscellaneous freight signal a business rise, too. Loadings in this category during the 4-week period ended Feb. 20 rose each week above the preceding week, according to the Association of American Railroads. Concurrently, total railroad freight car loadings are running substantially below a year ago.

Meanwhile, during the holiday week ended Feb. 27, STEEL's industrial production index slipped to 206 per cent of the 1936-1939 average, 3 points off from the preceding week.

Changed Circumstances . . .

The slide-off from last summer's business peak is bringing many changes. The decline in railroad traffic led the Pennsylvania Railroad to send word throughout the system to cut expenses to the bone.

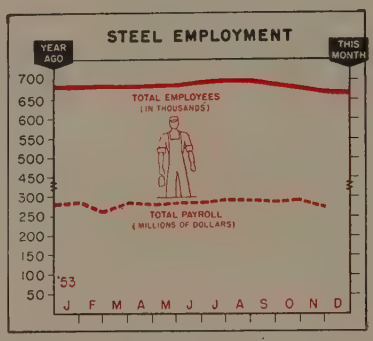
With competition heightening in the automobile industry, the independents' outturn in February of 21,400 cars was the lowest in seven and one-half years. On the other hand, Ford output in the latest week reached a 3-year high, *Ward's Automotive Reports* relates.

Price Changes . . .

The price cut in coal, due to overproduction, is responsible for the closing by the Peabody Coal Co. of two high-cost mines. And the increase in the cost of living (Consumer Price Index) between mid-December and mid-January of 1.3 percentage points, which is counter to the generally anticipated longer-term trend, has been caused largely by the increase in food prices. In January this index of the Bureau of Labor Statistics pointed to 115.2 per cent of the 1947-1949 average, 0.2 of a percentage point below the all-time peak reached last October.

Basic Problem . . .

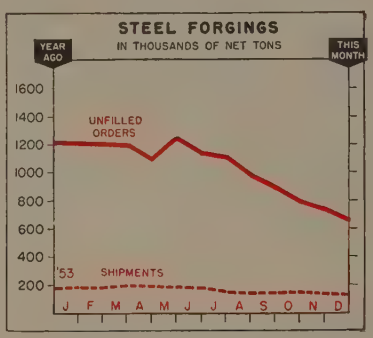
Unemployment is still in the ascendency. It is expected to stop



Steel Employment, Payrolls

	in Thousands		in Millions	
	1953	1952	1953	1952
Jan.	684	672	$285.4	$252.2
Feb.	685	674	261.3	234.9
Mar.	683	672	281.0	242.7
Apr.	685	670	278.0	225.6
May	685	662	281.0	223.1
June	690	*	282.1	*
July	696	*	288.1	*
Aug.	696	660	287.3	250.4
Sept.	688	674	283.8	269.4
Oct.	678	677	290.6	282.9
Nov.	667	680	268.5	269.7
Dec.	656	634	....	280.0

*Not available because of steel strike. American Iron & Steel Institute.

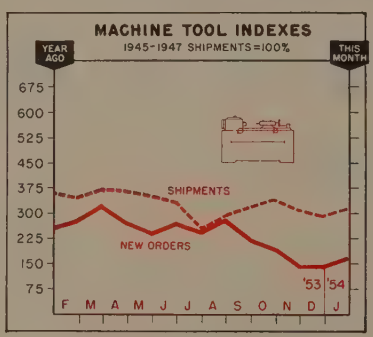


Steel Forgings*

Thousands of Net Tons

	Shipments		Unfilled Orders	
	1953	1952	1953	1952
Jan.	184	271	1,207	1,472
Feb.	184	277	1,199	1,464
Mar.	200	266	1,197	1,360
Apr.	196	277	1,082	1,349
May	191	263	1,239	1,319
June	185	224	1,135	1,248
July	155	132	1,081	1,290
Aug.	151	121	974	1,399
Sept.	153	150	882	1,392
Oct.	156	178	798	1,393
Nov.	143	156	740	1,399
Dec.	144	181	666	1,377

U. S. Bureau of the Census. *Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.

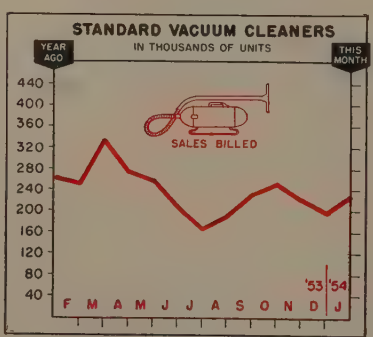


Machine Tool Indexes

1945-1947 Shipments=100

	New Orders		Shipments	
	1954	1953	1954	1953
Jan.	173.7	255.8	319.6	361.6
Feb.	....	282.1	....	354.5
Mar.	....	327.0	....	375.9
Apr.	....	276.8	....	372.7
May	....	246.4	....	356.0
June	....	273.4	....	342.2
July	....	247.3	....	267.6
Aug.	....	286.9	....	299.6
Sept.	....	223.7	....	328.3
Oct.	....	198.7	....	348.4
Nov.	....	146.6	....	320.2
Dec.	....	149.8	....	301.4

National Machine Tool Builders' Assn.



Standard Vacuum Cleaners

Sales Billed—Units

	1954	1953	1952
Jan.	221,233	255,886	223,357
Feb.	.....	246,007	230,226
Mar.	.....	329,294	290,092
Apr.	.....	263,548	217,169
May	.....	252,404	216,969
June	.....	197,506	206,939
July	.....	159,446	188,715
Aug.	.....	188,536	222,413
Sept.	.....	227,253	237,541
Oct.	.....	249,383	292,474
Nov.	.....	216,227	254,297
Dec.	.....	190,773	249,032
Total	.....	2,781,263	2,841,803

Vacuum Cleaner Mfrs. Assn.

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Issue Dates on other FACTS and FIGURES Published by STEEL

Construction .....Feb. 22	Gray Iron Castings.Jan 18	Ranges, Elec. .....Jan. 8
Durable Goods ...Dec. 14	Indus. Production..Feb. 15	Ranges, Gas .....Jan. 11
Employ., Metalwk..Feb. 22	Ironers .....Feb. 15	Refrigerators .....Jan. 8
Fab. Struc. Steel .Mar. 1	Malleable Castings.Jan. 18	Steel Castings ....Jan. 18
Foundry Equip. ..Mar. 1	Prices, Consumer ..Dec. 7	Steel Shipments ..Jan. 11
Freight Cars .....Feb. 22	Prices, Wholesale .Mar. 1	Wages, Metalwk. .Mar. 1
Furnaces, Indus. ..Jan. 8	Pumps .....Nov. 16	Washers .....Feb. 15
Gears .....Feb. 15	Radio, TV .....Feb. 22	Water Heaters ....Jan. 11

rising after "the next two months Secretary of Labor James Mitchell says.

Biggest Borrowers . . .

Amount of new corporate s curities offered for cash last ye reveals not only a downward ec nomic turn but also a shift in rection. Offerings of $8.9 billi were 7 per cent less than in t record year of 1952, the Securiti & Exchange Commission repor And manufacturing compani which comprised the largest sing group of issuers in 1952 with ferings of over $4 billion, issu only a little more than half th amount in 1953. In contrast, sues of financial and real esta companies were three times t 1952 amount, reaching over $1 billion. Thus in 1953 our econon changed from one expanding produce enough to satisfy milita and civilian demands to one which civilian demand had to greatly supplemented to keep fa tories at near-capacity.

Bargains . . .

Present prices of common stoc are relatively low in relation the dividends paid. A chart the latest issue of the Clevela Trust Co. "Business Bulleti shows prices in January were on 16.9 times the dividends. Not on was the January level considerab under the highest level of the la 25 years, but it was also below t average during the same period.

High-Level Home Planning . . .

To continue home building at high level, Ronald J. Chinnoc president, National Association Real Estate Boards, emphasizes t importance of improving the flo of mortgage money. His organ zation heartily endorses Preside Eisenhower's request for a mor gage marketing facility within t Federal National Mortgage A sociation, which initially at leas will purchase mortgages that ha been insured by the Federal Hou ing Administration or guarante by the Veterans Administratio Mr. Chinnock also wants to broad the insurance function of the Fe eral Housing Administration; it i sures home purchase loans made

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
DUSTRY			
eel Ingot Production (1000 net tons)[2]	1,730	1,779	2,240
ectric Power Distributed (million kwhr)	8,396	8,551	8,070
um. Coal Output (daily av.—1000 tons)	1,205	1,266	1,442
troleum Production (daily av.—1000 bbl)	6,325[1]	6,319	6,521
nstruction Volume (ENR—millions)	$225.7	$149.7	$144.1
tomobile, Truck Output (Ward's—units)	146,116	148,257	167,779
ADE			
eight Car Loadings (unit—1000 cars)	600[1]	619	669
siness Failures (Dun & Bradstreet, no.)	204	215	178
rrency in Circulation (millions)[3]	$29,838	$29,821	$29,735
pt. Store Sales (changes from year ago)[3]	+2%	−1%	+2%
NANCE			
ank Clearings (Dun & Bradstreet, millions)	$16,356	$18,550	$14,264
ederal Gross Debt (billions)	$274.7	$274.7	$267.5
ond Volume, NYSE (millions)	$14.4	$18.9	$14.5
tocks Sales, NYSE (thousands of shares)	6,205	8,712	8,968
oans and Investments (billions)[4]	$79.9	$79.9	$77.1
. S. Gov't Obligations Held (billions)[4]	$32.3	$32.4	$31.1
RICES			
TEEL's Finished Steel Price Index[5]	189.74	189.74	181.31
TEEL's Nonferrous Metal Price Index[6]	201.3	201.3	210.9
ll Commodities[7]	110.5	110.5	109.6
ommodities Other Than Farm & Foods[7]	114.3	114.4	113.1

Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549; 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

vate lenders to private borrow-

nstruction Indicators . . .

Reflecting the current high level construction, shipments of $65.4 llion worth of plumbing fixtures the fourth quarter almost equal- the same period in 1952 and, actically speaking, were under ly the fourth quarters in 1950 d 1951. On the other hand, ship- nts of fabricated structural steel January, although on a high ane, are not backed up the way ey were a year ago. While Jan- ary shipments of 240,637 tons ere only 1000 tons less than in nuary, 1953, contracts closed ring the month totaled only 167,- 36 tons, 100,000 tons less than a ear earlier, the American Insti- te of Steel Construction says in s latest report.

ales Aid . . .

To enable dealers to carry a ood selection of appliances, West- nghouse Electric Corp. has fol- owed the lead of another appliance anufacturer and created a sup- lementary credit organization. Vestinghouse's credit corporation, wholly owned subsidiary to be apitalized at $10 million, is in addition to the 6-year-old Westinghouse Equity Plan, under which more than 4500 banks and credit agencies are providing local financing for Westinghouse dealers. Establishment of these organizations follows several months in which sales have declined from last year's peak.

Auto, Truck Output

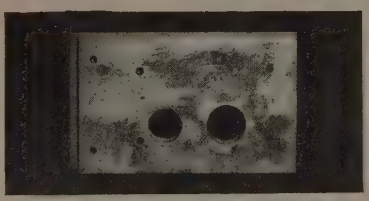
U. S. and Canada

	1954	1953
January	594,789	614,000
February		623,793
March		752,474
April		782,453
May		685,390
June		713,206
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,813,884

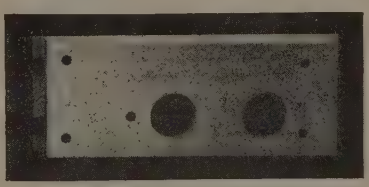
Week Ended	1954	1953
Jan. 30	143,654	150,289
Feb. 6	138,987	146,809
Feb. 13	142,097	147,103
Feb. 20	148,257	161,860
Feb. 27	146,116	167,779
Mar. 6	148,000*	158,825

Source: Ward's Automotive Reports. *Estimated by STEEL.

How Diebold, Inc. keeps their SAFES SAFE from rust



This part from a Diebold safe door was covered with fingerprint neutralizer, then spotted with synthetic perspiration. In a matter of days destructive rust was apparent.



This Diebold safe door part was spotted with synthetic perspiration, covered with fingerprint neutralizer, then wrapped with Marvellum VPI. At the end of the test there was no indication of rust. The part was in the same excellent condition as the day it was made.

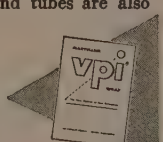
with MARVELLUM vpi WRAP

No wonder, after the tests shown above, Diebold Inc. chose Marvellum VPI® Wrap to protect their safes from rust. All ferrous metal parts are now kept wrapped from the moment they are made and each safe . . . large or small . . . is protected by Marvellum VPI before and during shipment. A special coating on the VPI paper vaporizes . . . forms an invisible protective film that positively prevents rust.

Marvellum VPI is easy to use . . . just fold the paper over the part. No need for time-consuming slushing or greasing. No mess or costly cleaning when the item is unwrapped. It's bright and clean, ready for immediate use.

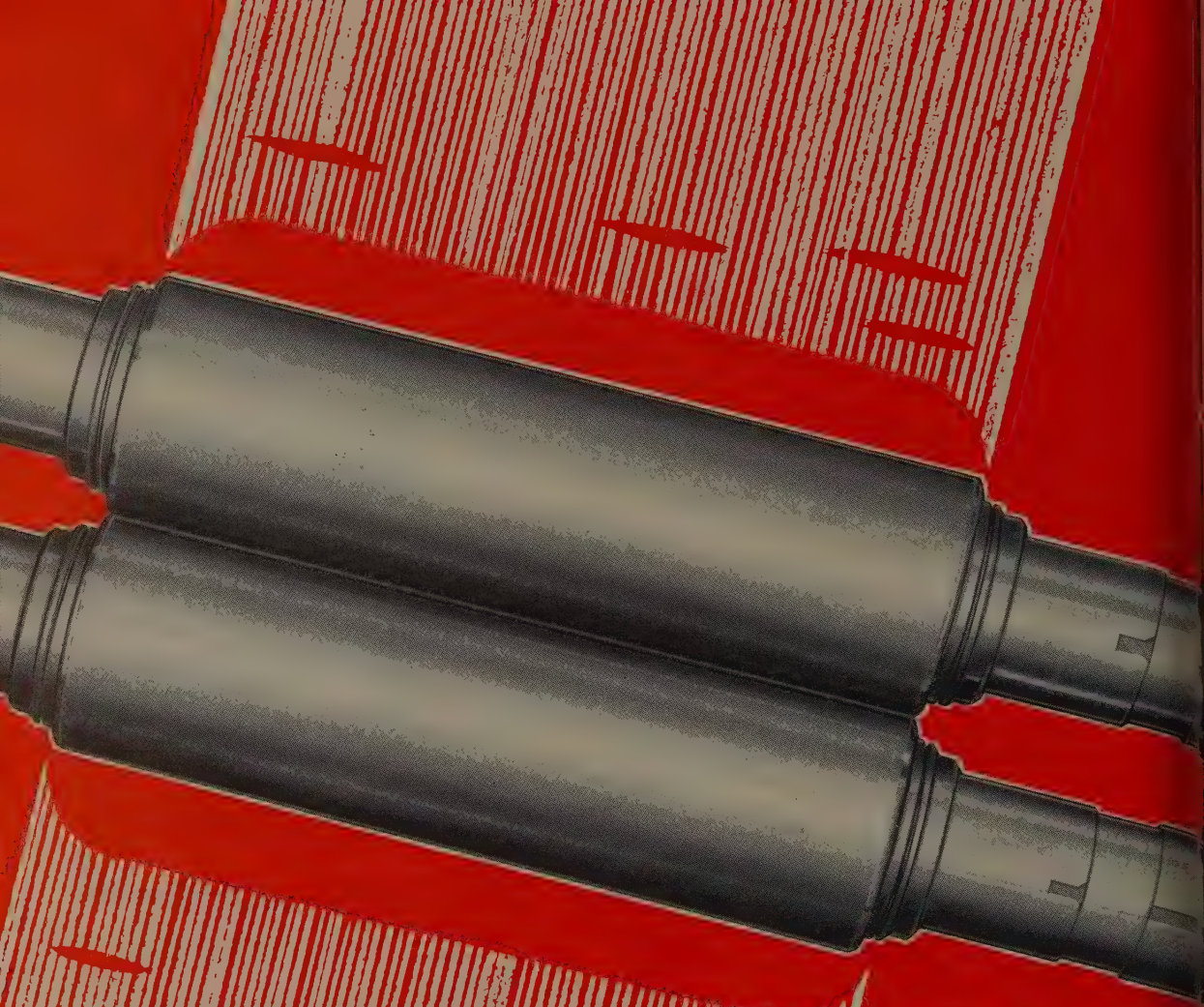
You'll find many uses for Marvellum VPI in your plant . . . wrap steel parts, protect inventories, line tote boxes.

Marvellum VPI is available in rolls of 20, 30, 40 and 60 lb. paper stock and *can be individually imprinted with your trademark* on quantity orders. Envelopes, sheets, bags, shrouds and tubes are also available.



FREE BOOKLET
Gives you all the facts.
Send for your copy today.

The Marvellum Company
1 Appleton Street Holyoke, Mass.



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SHAPING METAL FOR ALL INDUSTRY

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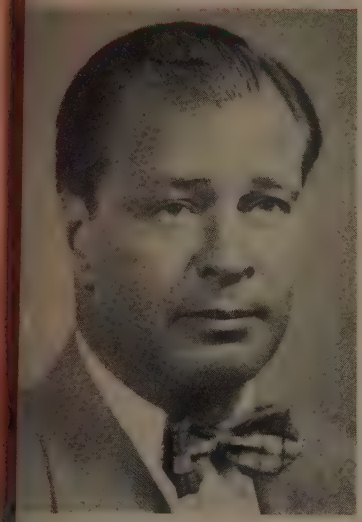
IRON ROLLS • NICKLE GRAIN ROLLS • SPECIAL IRON ROLL
NIOLOY ROLLS • FLINTUFF ROLLS • OHIO DOUBLE-POUR ROLL

THE OHIO STEEL FOUNDRY CO

LIMA, OHIO • Plants at Lima and Springfield, Ohio



ROBERT W. CLYNE
. . . Pressed Steel Car v. p.-marketing

PAT LEONE
. . . Deepfreeze Appliance operations mgr.

CARL J. DEMRICK
. . . Plymouth v p.-manufacturing

bert W. Clyne was elected vice esident-marketing, **Pressed Steel r Co. Inc.**, New York. He was eviously an officer and division- sales manager, American Steel oundries Co., Chicago.

ndrew TenEyck was elected vice esident in charge of sales and **hn A. O'Brien** vice president in arge of manufacturing of **Soss fg. Co.**, Detroit.

harles Dreifus Co., Philadelphia, ppointed **Robert A. Ziesing** chief ld metallurgist of its Bill-Ettes ivision. He was formerly as- stant metallurgist with Dodge teel Co.

. A. Johns was promoted to gen- ral sales manager of Sharon Steel orp.'s **Detroit Tube & Steel Di- ision**, Detroit. **Robert I. Petrie** was amed manager of the order de- artment at the Detroit plant. Mr. ohns joined the division in 1947 s assistant sales manager.

W. Gerard McKee, Fayetteville, N. Y., was named to represent the steel division of **Henry Disston & Sons Inc.** in Schenectady, Syracuse and Rochester, N. Y., areas. He will handle hot-rolled steel prod- ucts.

John W. Peters was appointed southeastern district manager, **Da- vey Compressor Co.** He will have headquarters in Wartburg, Tenn.

Pat Leone was appointed to the newly created position of manager of operations of **Deepfreeze Ap- pliance Division**, Motor Products Corp., Chicago. Mr. Leone, former- ly plants manager, assumes over-all responsibility for production, per- sonnel and purchasing. **J. A. Rishel Jr.**, formerly with Youngstown Kitchens Division, Mullins Mfg. Corp., was made general sales man- ager of appliances. **B. G. Sander- son**, general sales manager of Deepfreeze since 1950, becomes general sales manager, contract sales.

Robert L. Parrish was named to manage the new plant of **Sprague Electric Co.**, now under construc- tion at West Jefferson, N. C. The new plant will manufacture ca- pacitors for the electrical and elec- tronic industries and will open late this spring.

W. Irwin Pollock was promoted to chief engineer at **Downingtown Iron Works Inc.**, Downingtown, Pa., di- vision of Pressed Steel Tank Co. **Edward C. Ashton** was made man- ager of sales of heat transfer equipment and **K. M. Irwin** man- ager of the New York sales office.

Richard Wessling, former vice president and director, Electric Supply Corp., was appointed dis- trict manager of the Chicago office of **Allen-Bradley Co.**

Chrysler Corp.'s **Plymouth Motor Corp.**, Detroit, elected **Carl J. Dem- rick** vice president in charge of manufacturing. He was appointed staff master mechanic of Chrysler in January, 1953, and the follow- ing April was promoted to general manufacturing manager at Ply- mouth.

Norman E. Carlson was appointed works manager in charge of all operations of the St. Charles, Mo., plant of **American Car & Foundry Co.** He succeeds **Roy D. Jablon- sky**, resigned.

At **L. J. Mueller Furnace Co.**, Mil- waukee, **Bob Johnston** was made production manager and **Carl Quick** director of industrial rela- tions.

Charles J. Breitwieser was elected vice president and director of en- gineering at **Lear Inc.**, Los An- geles.

Edward E. Bauer was appointed superintendent of regulator manu- facturing for **General Electric Co.'s** power transformer department at Pittsfield, Mass. He was formerly manager of transformer apparatus sales and is replaced by **Chris- topher T. Kastner. Robert T. Hol- land** was named sales manager of GE's aircraft accessory turbine de- partment.

Leland B. Flint of Salt Lake City,

HOWARD H. CHAPIN
. . . supt. at Republic's cold-rolling mill

ELMER A. SCHWARTZ
. . . Great Lakes Steel gen. mgr.-operations

FRANCIS J. KINSELLA
. . . Standard Pressed Steel sales post

Utah, was elected a director of **Kennecott Copper Corp.**, New York.

Howard H. Chapin was appointed superintendent of **Republic Steel Corp.'s** 98-inch cold-rolling mill. Cleveland. He succeeds **Clemens A. Tartar** who transfers to the Warren, O., district. Mr. Chapin became finishing foreman at the strip mill in 1937. In 1951 he was made assistant superintendent, a post now filled by **George R. Goss.**

Claude B. Schneible Co., Detroit, appointed **Tom Butler** as a special representative. He will be available for consultation on special engineering problems involving installation of Schneible dust collecting systems for foundry operations.

Fairchild Engine & Airplane Corp. appointed **William L. Smith** as general manager of its Fairchild Speed Control Division, Wickliffe, O.

At **McLouth Steel Corp.**, Detroit, **C. Thorne Murphy**, director of purchases and assistant secretary, was promoted to vice president and assistant secretary.

National Steel Corp. announces appointments to the executive staff of its division, **Great Lakes Steel Corp.**, Detroit. **Paul Carnahan** was made vice president and assistant to the president, **Albert C. Childs** vice president and general manager of sales, **Elmer A. Schwartz** general manager of operations, **Harry C. Burton** director of industrial relations and **David M. Moon** director of personnel relations.

E. L. Barnett, former senior engineer for A. T. Kearney & Co., joined **Binks Mfg. Co.**, Chicago, as works manager. He will supervise the manufacturing division.

Francis J. Kinsella was named manager of outside sales by **Standard Pressed Steel Co.**, Jenkintown, Pa. Formerly midwest regional sales manager, he moves to a post left vacant when **George A. Gade** was elected vice president in charge of sales last year.

W. C. Brigham, marine sales engineer at **Bethlehem Pacific Coast Steel Corp.'s** San Francisco shipyard since 1947, was appointed assistant to the manager.

Donald A. FitzRoy was appointed manager of the industrial products division, **Metal Goods Corp.**, St. Louis. Formerly assistant manager, he joined Metal Goods in 1949 as a general line salesman. Previously he was with Air Reduction Co. for a number of years.

A. Kommel, junior partner of **Bell Equipment Co.**, Los Angeles, retired Dec. 31. His interest has been purchased by **Frank X. Bale.**

Seaver C. Kenyon was appointed assistant sales manager, **West Steel Casting Co.**, Cleveland. **Herbert J. Swanson** has joined the sales department. He formerly was with Bryant Heater Division, Affiliated Gas Equipment Co.

E. Philbin de Got was elected vice president of **United Drill & Tool Corp.**, Chicago. He continues as sales manager of its division, Chicago-Latrobe Twist Drill Works.

Carlos H. Horne, former northern California regional manager, was promoted to assistant general manager of **Rheem Mfg. Co.'s** western division.

Vol-Shan Mfg. Co. Inc. named **Warren H. Franks** to head its new industrial division in Culver City, Calif.

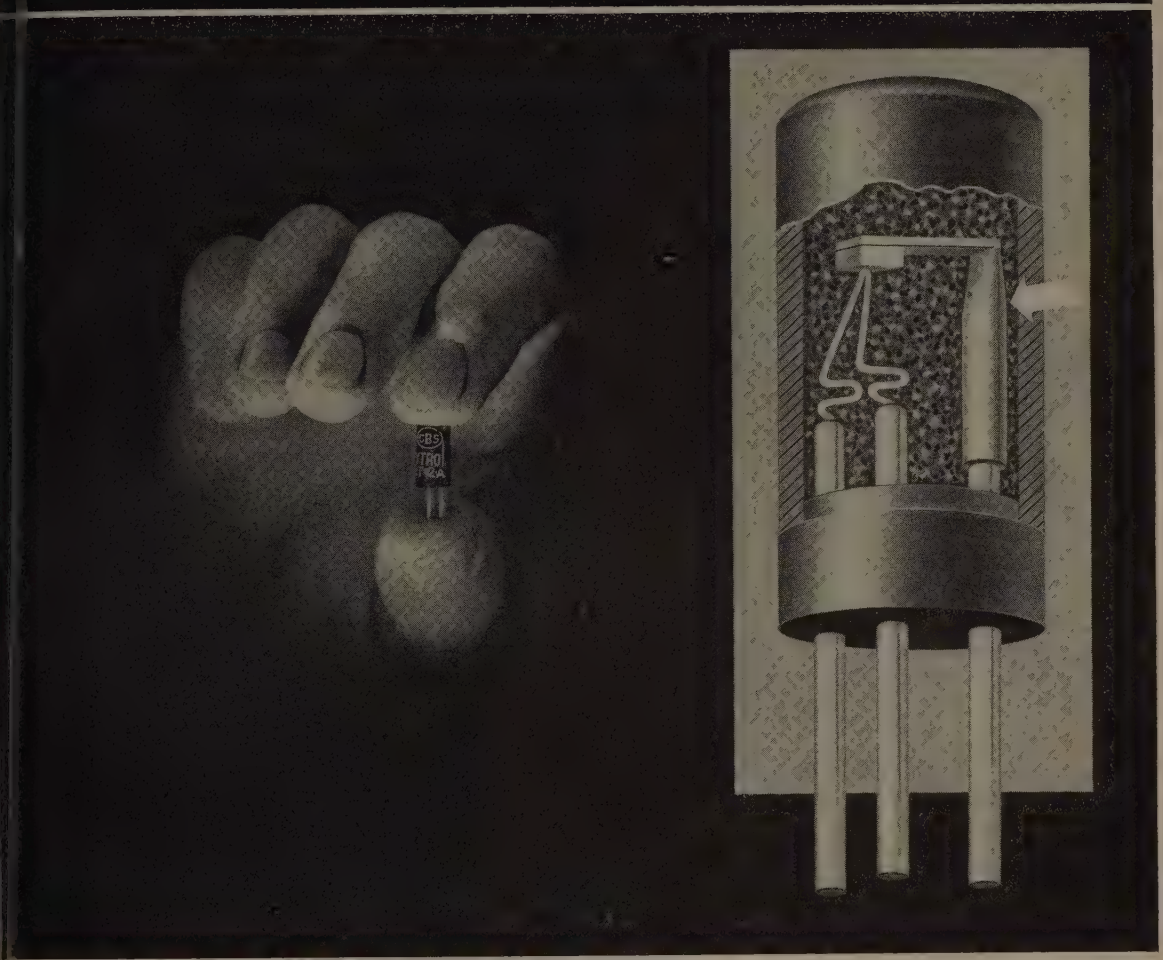
Henry T. Thomas was made assistant general manager of **Roylyn Inc.**, Glendale, Calif.

Pittsburgh Steel Co. promoted **Andrew G. Scott**, former salesman, to the position of assistant district sales manager, Detroit district.

Herbert F. Middleton was made western area manager at Los Angeles for **Acme Steel Products Division**, Acme Steel Co. He replaces **Squire J. Johnson**, retired as western area manager to assume responsibility with the parent company for production and sales of flexible steel conduit. **William H. Smythe Jr.** replaces Mr. Middleton at San Francisco as district sales manager and is in turn replaced by **C. G. Moreau** as special representative.

A. J. Van Harn has been retained as executive assistant to A. J. Grindle, president, **Grindle Corp.**, Harvey, Ill. He will be in charge of sales and advertising for the company's engineering service, air purification and fuel equipment. In

Transistors use Tubing...can you?



Something has happened in electronics of importance to you in more ways than one.

It's a tiny device called the Transistor—successor, enthusiasts say, to some vacuum tubes.

The one above, made by CBS-Hytron, a division of Columbia Broadcasting System, Inc., is no larger than your little finger nail.

You'll soon be listening to or looking at transistorized radio and TV—or saving space, weight and power with transistors in other equipment, such as telephones, calculators or computers. Then the materials in a transistor will be of top importance to you.

Each CBS-Hytron transistor contains a gnat-sized bracket made possible by using the good welding, soldering and formability properties of seamless nickel tubing.

Whether you need one foot of tubing for a trial balloon or one million feet for production, let Superior people and Superior's 55 analyses help you. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Round and Shaped Tubing Available in Carbon, Alloy, and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium.

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All analyses .010" to ⅝" O.D.
Certain analyses in Light Walls up to 2½"

sales and advertising for 12 years, Mr. Van Harn has been engaged in selling industrial products and construction service in the midwest.

Denison Engineering Co., Columbus, O., appointed **Paul W. Norris** director of sales, **Robert H. Krepps** sales manager and **Robert R. Hyatt** director of industrial relations. Mr. Norris, formerly sales manager, pump and control division; also served as chief engineer and sales manager, multipress division; and manager, research and development and marketing divisions.

Daniel S. de Rimini is the newly named general sales manager of **Anton Smit & Co. Inc.**, New York. **Frans Meyjes** was promoted to vice president in charge of production and **Oscar A. Tellier** to treasurer.

Robert Richmond joined **Bliss & Laughlin Inc.**, Harvey, Ill., as assistant western sales manager. He has been with U. S. Steel Corp.'s American Steel & Wire Division since 1937.

C. Paul Porterfield was elected vice president and general manager of **Method X Co.**, an affiliate of Firth Sterling Inc., Pittsburgh. He previously was chief engineer.

Morell C. Smith, previously with Sylvania Electric Products Co., joined **Sage Equipment Co.'s** engineering staff at Buffalo.

John Miche was appointed a sales engineer of **Connor Spring Mfg. Co.**, San Francisco.

Albert H. Leader was made district manager for the Seattle office of **Anaconda Wire & Cable Co.** He succeeds **Lloyd Wolfe**, retired.

A. M. RIDDLE
. . . exec. asst. to CF&I president

A. M. Riddle was appointed executive assistant to the president of **Colorado Fuel & Iron Corp.**, New York. Since 1942 Mr. Riddle has been manager of the corporation's market research department.

KSM Products Inc., Merchantville, N. J., named **H. L. Wagener** as special consultant to its technical research group to guide in developing new materials and processes in stud welding.

Parker Appliance Co., Cleveland, appointed **Walter C. Loeman** manager, tube and hose fittings division, to succeed **L. C. Aldridge**, resigned. **James F. Davis Jr.**, formerly purchasing agent, industrial hydraulics division, replaces Mr. Loeman as production manager for that division. The purchasing agent vacancy will be filled by **Wayne D. Harrold.** Sales engineers appointed by the company include **Robert D. Beatty Jr.** for the Alabama-Florida territory and **Harold E. Kirby** for the Carolina and eastern Tennessee territory.

Louis Calzi was appointed to the development metallurgical staff by **Superior Tube Co.**, Norristown, Pa. He was formerly employed by Ajax Electric Co. in Philadelphia as a sales engineer.

Thor O. Loe was appointed sales manager for **Reo Motors Inc.'s** lawn mower division, Lansing, Mich. He has served as a regional manager in the midwestern region since joining the Reo staff in 1948.

Ira C. Matthiessen was appointed district sales manager for **Columbia Tool Steel Co.**, Chicago Heights, Ill. He will cover southern California with headquarters in Los Angeles.

Westinghouse Electric Corp.'s appliance division appointed **M. E. Lanning** southeastern regional manager, major appliances, and **A. Dwight Lynch** southeastern regional manager, portable appliances. They will be located in Atlanta. **Winston H. Anderson** was made central regional manager, portable appliances, with headquarters in Cleveland.

William F. Rochow, in line with retirement policy, relinquishes his title of vice president in charge of technical sales and research, **Harbison-Walker Refractories Co.**, Pittsburgh, to continue as assistant to the president—research and development.

OBITUARIES . . .

Norman F. S. Russell, 74, chairman of the board of **United States Pipe & Foundry Co.**, East Burlington, N. J., died Feb. 24. He was president from 1923 to 1948.

Henry H. Budds, 50, who recently joined the **Hamilton Standard Division**, United Aircraft Corp., Windsor Locks, Conn., died at work Feb. 18. Mr. Budds was formerly general manager of Briggs Mfg. Co., Detroit, and from 1941 to 1947 served as vice president-general manager, Fairfield Aircraft & Engine Co., Farmingdale, R. I.

Eugene U. Paris, 67, part owner of **Indiana Screw Machine Products**, Worcester, Mass., died Feb. 16.

John J. McDevitt, 75, for more than 50 years Milwaukee sales representative of **S. Obermayer Co.**, died Feb. 20.

Orrin F. Douglas, 68, who organized **Special Screw Products Co.**, Cleveland, in 1926, died Feb. 18.

Clinton L. Rice, 61, director of purchases for **Owens-Illinois Glass Co.**, Toledo, O., for nearly a quarter century, died Feb. 18.

William H. Knight, 84, who organized **Cleveland Gas Meter Co.**, Cleveland, in 1895, died Feb. 15.

Herman A. Brenner, 53, president, **Therm-O-Rite Products Co.**, Toronto, Ont., died Feb. 23 at his home in Buffalo.

Joseph R. Brandt, 63, special accounts representative and former Cleveland district manager, **Bridgeport Brass Co.**, died in Cleveland Feb. 19.

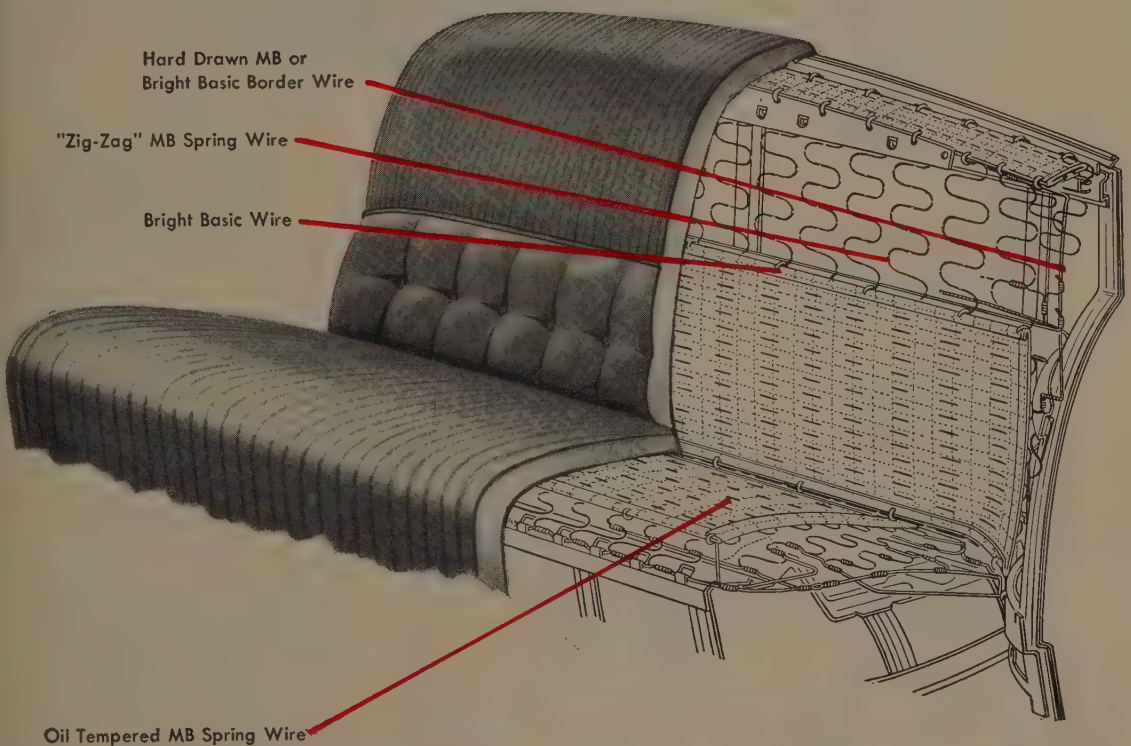
iding comfort starts with

Wickwire Wire

New types of spring construction for seat and back cushions add immeasurably to the smooth, easy-riding comfort of today's automobiles.

Here again, as in so many other instances, the complete range of Wickwire Wire—high or low carbon, in all tempers, finishes and grades—provides exactly the right kind of wire for all parts of the complete spring assembly.

Good reason why Wickwire Wire is selected for the cushion spring units on many of America's leading makes of cars. Good reason, too, why it will pay you to remember—For The Wire You Require; Check First With Wickwire.



THE COLORADO FUEL AND IRON CORPORATION—Denver & Oakland
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Chicago • Detroit • New Orleans • New York • Philadelphia

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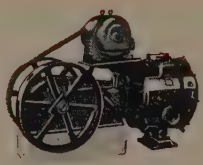
THE COLORADO FUEL AND IRON CORPORATION

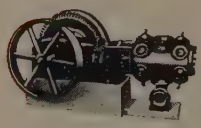
HEAVY-DUTY
"ES" COMPRESSORS

provide maximum efficiency in a
WIDE RANGE OF APPLICATIONS

. . . with unusual flexibility of drive and cylinder arrangements



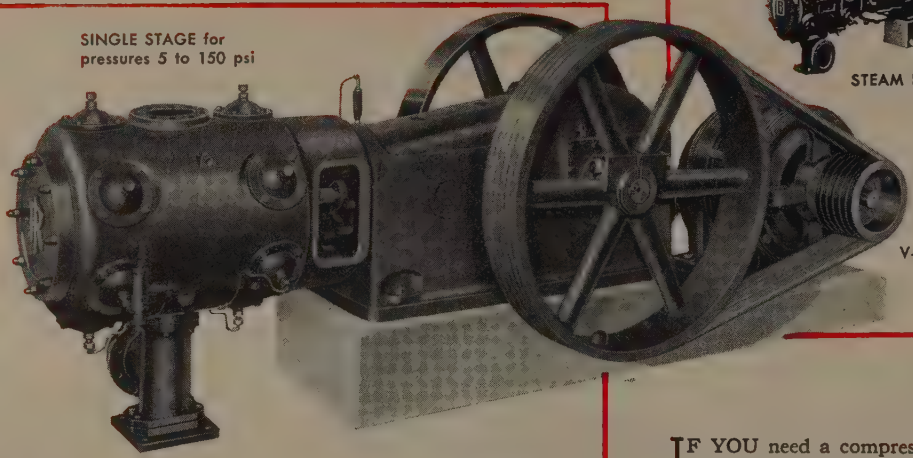
OVERHEAD MOTOR



DIRECT-CONNECTED SYNCHRONOUS MOTOR

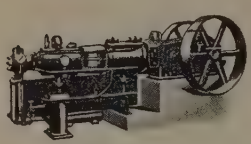
STEAM DRIVE

SINGLE STAGE for pressures 5 to 150 psi

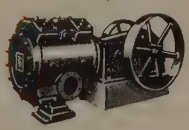


V-BELT DRIVE

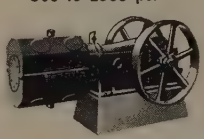
TWO STAGE for 150 to 500 psi



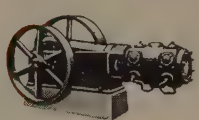
THREE STAGE for 500 to 2500 psi



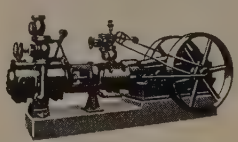
DRY VACUUM PUMPS . . . single or two stage



STEAM-PRESSURE BOOSTERS



NON-LUBRICATED CYLINDERS for oil-free air or gas



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IF YOU need a compressor for any of the following purposes you should consider the Type "ES" compressor . . . a standardized, yet extremely flexible compressor built by Ingersoll-Rand, the pioneer compressor builder.

- To compress air or gas to any pressures between 5 and 2500 psi, or for pulling vacuums. (Stock cylinders are normally available for all frame sizes, see illustrations.)
- For capacities requiring from 5 to 125 horsepower. (Six frame sizes are available.)
- For continuous full-load operation day after day, week after week.
- For handling poisonous, inflammable, or other gases where leakage must be avoided.
- Where compressed air or gases must be free of all traces of oil. (Type NL cylinders require no oil, glycerine, grease or water for lubrication.)
- Where a future change in pressure conditions may call for a change in cylinder sizes.
- Where power cost is an important factor.
- To act as an economical standby unit for larger compressors whose full capacity is not required at all times.

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(*Concluded from Page* 88)

th-cost kellering and barbering. the strength of that, many be- ve tooling costs per part with stic dies should enable the in- pendents to get competitive.

Another possibility that looks od for the independents is the e of plastic and steel in the me body. Preponderant nipper ght now is varied aging charac- ristics of painted surfaces on astic as contrasted with steel. eeded is a good primer paint at will inhibit the organic in- uence resulting in the unmatch- g paint. The development of ch a primer does not look far own the road. When it comes, e independents can go to a basic eel body shell with annual anges of plastic fenders, deck ds and hoods at relatively low ost.

Innovating Role—These develop- ents have a far-reaching signifi- ance, for they are related to he traditional existence of the in- ependents as innovators.

Over the formative years of the uto industry, the independents existed largely because they of- ered mechanical features other nanufacturers did not have. These eatures were not expected to ap- eal to everyone, but they did have definite appeal to certain people ooking for something different. One of the latter developments in this era which extended through the 1930s was the Hudson preselec- tor column shift, and you'll find people today who still swear it was one of the greatest things ever put on an automobile.

Once a Natural—Mechanical in- novations were a natural for the independents for two very intelligi- ble reasons. From a sales stand- point, they were understandable reasons to buy. A customer knew what he was buying and in a com- paratively specific way why. From a manufacturing standpoint, these devices could be tooled in most cases on standard machines at com- paratively low cost. Secure in the knowledge that the device offered certain advantages and with digest- ible tooling cost, the independent could feel reasonably confident his investment was worthwhile.

But today the reign of mechani- cal innovations is largely in the past. They keep coming, of course, but the primary thing that sells a car is style. And innovating in style has been something to make any auto company neurotic after the famous Chrysler jump into the future in 1935. Once a style ven- ture flops, the topheavy tooling costs stand a good chance of tip- ping the company. That's why most auto men look at the Stude- baker venture in awe and stick close to the breadbox in designing their own cars.

"Merger per se is not the solution to anything."

Dilemma of Difference—Making cars that are different has been the antithesis of mass production ever since the days of the black model T Ford, the epitome of standardization ad nauseum.

Now as mass production be- comes massive production there are growing indications that wider choice of color alone is not going to make one car sufficiently dif- ferent from another.

GM, Ford Show Trend—That's why perhaps the most significant evidence of all relative to the future of the independents is pro- vided by the two biggest sellers, Ford and Chevrolet. Their ven- tures into the Thunderbird and Corvette, respectively, demonstrate an awareness that the public is showing increased interest in cars that are different. And providing cars that are different has been the traditional forte of the inde- pendents.

The time appears to be at hand for a new field of innovation—in styling—and plastics appear to show the way. But plastics are still in the future and the inde- pendents have their job cut out for them in the immediate years ahead in modernizing and expand- ing their facilities. Further pool- ing of capital for the purpose may be required, and for that reason it's safe to assume that there will continue to be mergers and ru- mors of mergers.

The Brighter Side—But don't sell the independents short. Al- though the immediate road ahead appears to be an uphill pull, even a small auto company is big busi- ness with considerable financial stamina.

And over the hill appears to lie a new era in the auto indus- try—perhaps paradoxically not unlike the years gone by. Could it be that while the big companies are working hard to keep their expanded facilities from overhead- ing them unduly, the independents will come along with a whole new crop of those beautiful and exclu- sive automobiles that turn men's thoughts fondly to the past?

Auto, truck output figures for the week will be found on page 93.

Heppenstall Buys Plant

Plans to have former Chapman-Price plant in Indianapolis operating in 15 months

HEPPENSTALL CO., Pittsburgh, steel forgings manufacturer, purchased the former Chapman-Price steel plant in Indianapolis. The plant consists of six manufacturing buildings and an office building on a 30-acre tract. It has about 190,000 sq ft of floor space under roof.

This is part of the firm's $2-million expansion program, says R. B. Heppenstall, president. The program has been in the planning stage for nearly a year. Because insufficient space was available at any of the present plant locations, sites in a number of different areas were considered. The firm has its main plant, general offices and research laboratory in Pittsburgh; owns other plants in Bridgeport, Conn., and New Brighton, Pa.; and has a warehouse and office building in Detroit.

Products—Principal products include die blocks, rolled rings, metal and wood-cutting knives, miscellaneous forgings, and materials handling equipment. The company has aided in "jet age" development by forging high-temperature alloy steels required for jet engines and gas turbines.

Heppenstall hopes to have the Indianapolis plant in operation in 15 months. It was built in 1918 by Chapman-Price Steel Co., subsidiary of Continental Steel Corp., Kokomo, Ind. It was sold in 1946 to Kaiser-Frazer Corp. which operated it through Whitney Steel Corp. as a source of sheet steel. Kaiser-Frazer sold the plant in 1949 to Romos Enterprises, Cleveland. It was operated until 1951 by Sheet Steel Mills Inc., but has been idle since that time.

National Acme Gets Agency

National Acme Co., Cleveland, manufacturer of multiple and single spindle bar and chucking automatics, was appointed exclusive sales representative in the United States for English-built B. S.A. single-spindle automatic screw machines. National Acme thus makes available from one source a complete line of single and multiple spindle automatics for all classes of bar machine work, from the very smallest to 7¾-in. diameters. The B.S.A. models are built by B.S.A. Tools Ltd., Birmingham, England, manufacturer of single and multi-spindle automatic bar and chucking machines, multitool production lathes, threading and tapping machines.

Grayson Controls To Build

Grayson Controls Division, Robertshaw-Fulton Controls Co., Youngwood, Pa., will construct a plant for the manufacture of thermostatic devices at Long Beach, Calif.

Poole Appoints Representative

Poole Foundry & Machine Co., Baltimore, appointed Parry Engineering Co., New York, as sales representative for its flexible shaft couplings.

Otis Opens Branch in Peru

Otis Elevator Co., New York, opened a branch office in Lima, Peru, with C. B. Scrivener serving as acting manager. Otis installed the first escalator in Peru recently in Bata Shoe Co.'s Lima store.

Dangerous Doings on TV

Television cameras keep track of the loading, assembly and disassembly of live ammunition in tests at Aberdeen, Md., Proving Ground. Here, a potentially dangerous mortar shell is locked in a vise ready for drilling, and the remotely-controlled drill is in position. A workman is adjusting the steel-encased viewing camera covering it. If an explosion occurs, the camera may go, but the workman has a chance

Conforming Matrix Expands

Conforming Matrix Corp., Toledo, O., opened a branch in Arcadia, Calif. The firm makes electroformed metal spray painting masks and air-operated fixtures, tools and automatic machines employed in production color decoration of three-dimensional parts.

Line Mfg. Inc. Organized

R. J. Lison organized Line Mfg. Inc., 1925 Blake Ave., Los Angeles, to manufacture industrial power sweepers.

Florence Stove To Move

Florence Stove Co., Gardner, Mass., will shift its executive offices and sales department to Chicago about June 1. A number of other units of the Gardner general offices will be moved to Lewisburg, Tenn., and Kankakee, Ill. The Gardner plant will continue its production of sleeve heaters, dual ranges, range burners and bungalow burners.

Plans $2-Million Plant

Warren Petroleum Corp., Tulsa, Okla., will build a $2-million plant at Conroe, Tex., for the production of petrochemicals. Work is under way and is scheduled to be completed by July, 1954.

Warner & Swasey Buys Firm

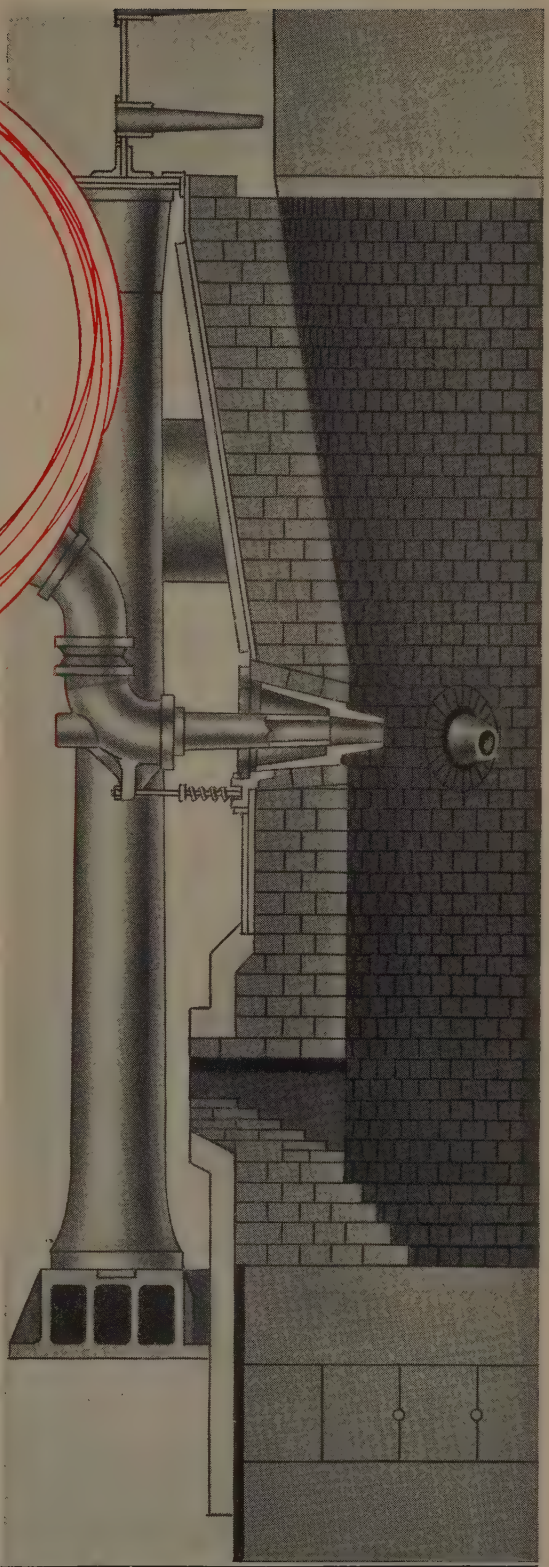
Warner & Swasey Co., Cleveland, purchased the business and assets of Industrial Scientific Co., New York, and organized Warner & Swasey Research Corp. to conduct the work of the former firm. Engaged in research activities for several industries, the New York company also produces an instrument which records minute variations in surface contours. Activities of the research organization will be expanded promptly to new projects in the fields of machine tools and textile machinery, which are the principal products of the parent company.

Officers of the new corporation

SAVE ALL THE WAY WITH NATIONAL

TRADE-MARK

CARBON BLAST FURNACE LININGS



Record operating economies — so outstandingly established by "National" carbon in blast furnace hearths—*needn't stop there!* Now you can get the same advantages — longer life, lower maintenance, smoother operation—with carbon linings in blast furnace walls, in tuyere and in bosch sections.

Present day economics indicate now, more than ever, a need for carbon "all the way". Let's talk it over in terms of *your* operation!

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

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A Division of Union Carbide and Carbon Corporation
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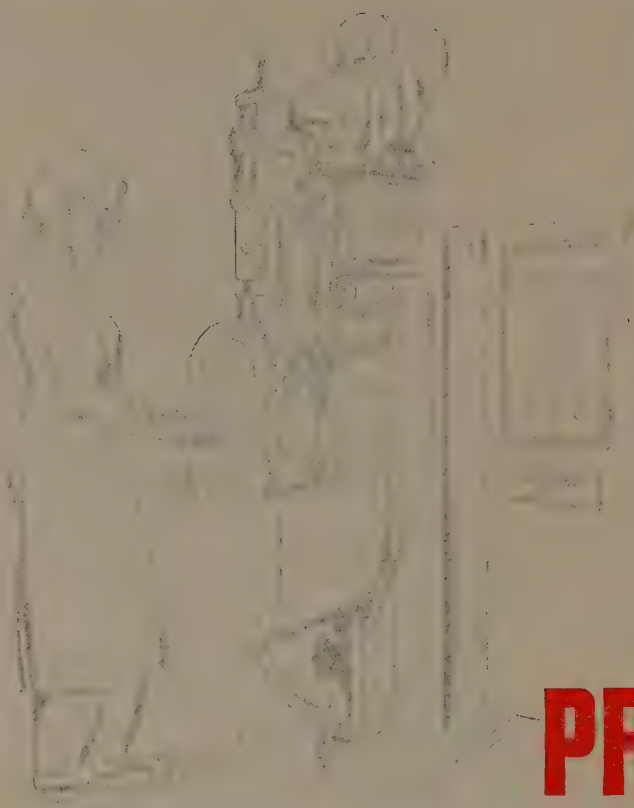
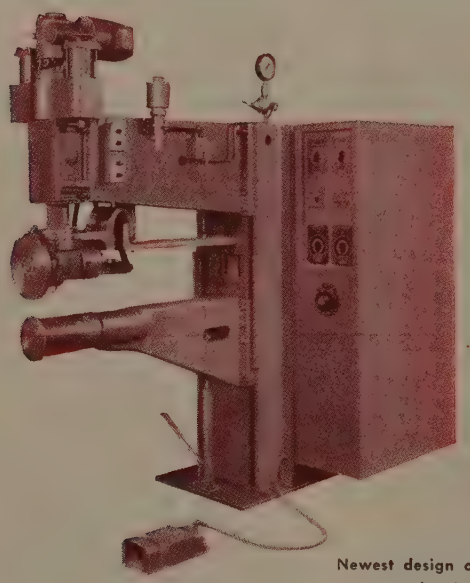


STANDARD SEAM WELDER MAINTAINS HIGH PRODUCTION

Standard Single Phase Seam Welder Fabricates Pressure Type Casco Steam Iron Tanks



Newest design of Sciaky Type MP2 air-operated, press type, low impedance, single phase, seam welder.

For more than two years Casco Products, Bridgeport, Conn., has been fabricating thousands of tanks every day for their fast selling Casco Steam Iron on a Sciaky Single Phase, low impedence, Seam Welder.

Formed of .023 Stainless Steel, the two halves of the tank are joined with approximately 26″ of pressure-tight seam weld.

After welding, the flange of the tank is trimmed along the centerline of the seam weld. Then, each tank is pressure tested for leaks. In production, rejects due to weld failure are too rare to mention.

This fine example of Casco design and production ability is one of many, many successful resistance welding applications. Maybe *you* don't make steam iron tanks, but if you want a faster, better, more economical method of joining metals in production, look to Sciaky electric resistance welding.

For other examples of resistance welding applications in industry, send name and title on company letterhead. All future regular issues of Sciaky "Resistance Welding at Work" bulletins will be sent free of charge.

See Sciaky General Catalog in Sweet's 1954 Machine Tool File, or write for Bulletin #301-D.

Largest Manufacturers of Electric Resistance Welding Machines in the World

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Plants: Chicago • London • Paris Sales Offices: Chicago, Ill. • Buffalo, N. Y. • Cleveland, Ohio • Dayton, Ohio • Detroit, Mich. • Ft. Worth, Texas • Hollywood, Calif. • New York, N. Y. • Philadelphia, Pa. • Washington, D. C.

Charles J. Stilwell, chairman; S. Tandler, president; C. W. s, treasurer; and E. B. Gaus- secretary.

ipmentmaker To Move

achinery Electrification Inc., cester, Mass., will move its en- operation to Northboro, Mass., ing purchased Commonwealth n Co. Inc. in the latter city. The engineers electronic equipment machinery while its subsidiary, e Insulating Machine Inc., kes respoolers and other wire- dling machinery.

Mfg. Names Representative

-P Mfg. Corp., Cleveland, ap- nted Donald B. Huntting Co., cinnati, as its representative in ton, O., where the firm main- s an office at 1904 Brown St. Weber is in charge of the Day- office. The Cleveland firm kes power-operated chucks, air hydraulic cylinders, air valves other products.

wal Opens Branch Office

Fenwal Inc., Ashland, Mass., nufacturer of temperature con- ls and fire detection equipment, ened a branch office at 549 W. shington St., Chicago. H. T. llins is branch manager.

rsh Steel Gets Agency

Marsh Steel Corp., North Kansas y, Mo., was appointed a distrib- or of aluminum products pro- ced by Aluminum Co. of Amer- , Pittsburgh. In addition to minum products, Marsh Steel o maintains stocks of stainless rbon and alloy steel. The com- ny maintains facilities at both Kansas City and Denver plants cut aluminum and steel to the act sizes required by its custo- ers.

eet Metal Works Sold

American Sheet Metal Works, w Orleans, has been purchased a group of businessmen in that y who will continue to oper- e it as American Metal Works c. Officers of the new corpora- n are Paul G. Charbonnet, pres- ident; Joseph A. Childress and G. A. Lyncker, vice presidents; and Harry N. Charbonnet, secretary-treasurer. The firm's plant is equipped for the "breaking" and shaping of steel, stainless steel, galvanized iron, aluminum, brass, copper and other metals in thicknesses up to ½ in.

Canadian Firm Expanding

Purchase of Presto Lighters Ltd. and Presto Lighters Sales Ltd. by L. E. Waterman Pen Co. Ltd. was announced in Montreal by the Savard & Hodgson investment firm. The firm is headed by Canadian interests that recently acquired control of the Waterman company from United States interests.

Will Make Copying Lathes

Industrial Metal Products Corp., Lansing, Mich., will make H.E.B. automatic copying lathes under an arrangement with H.E.B. Machine Tools Inc., New York. The latter company previously imported its copying lathes from its parent French company, H. Ernault Batignolles. Sales distribution will continue through dealers established by H.E.B. Machine Tools Inc.

Licenses English Firm

C. O. Bartlett & Snow Co., Cleveland, has made an agreement with Coleman-Wallwork Co. Ltd., foundry engineers, Windsor Works, Stotfold, Arlesey, Beds, England, under which the latter company will manufacture and sell Bartlett & Snow car-type mold conveyors in Asia, Africa and Sterling areas. The English company specializes in equipment and machinery for foundries.

Abrasives Firm Opens Office

Sterling Abrasives Division, Cleveland Quarries Co., Tiffin, O., opened a warehouse and sales office at 5801 Rising Sun Ave., Philadelphia. A stock of grinding wheels and related abrasive items will be carried. John A. Baker is the Philadelphia district manager.

Roll Heads Engineering Group

National Association of Corrosion Engineers, New York, elected Kempton H. Roll of Lead Industries Association, that city, as chairman of the northeast region. E. G. Brink, American Viscose Corp., Philadelphia, was elected

(*Continued on Page* 108)

Nothing but the Best for Diesels

Opening of 300-foot conveyorized diesel engine production line at Cummins Engine Co. Inc., Columbus, Ind., marked completion of building portion of the company's $7-million postwar expansion program. The line is housed in an air-conditioned, dust-proof structure and includes much automatic equipment

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...your Morse-Franchised Distributor!

No matter who brings up the tough questions on cutting-tool applications, your Morse-Franchised Distributor has the *right* and *ready* answers. Plus the hard-earned practical experience to go out in your plant with your men and prove the soundness of his recommendations.

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PURCHASING AGENT
MORSE FRANCHISED DISTRIBUTOR
MORSE
Cutting Tools
Buy them by phone from your Morse-Franchised Distributor and save ordering time

(*Continued from Page* 105)

vice chairman, and E. J. Titsworth, Koppers Co., Pittsburgh, secretary-treasurer.

Plans Diversification

Crompton & Knowles Loom Works, Worcester, Mass., plans to buy whole companies in order to diversify its products. Purchases are planned in one or more of three "growth" fields: Mechanical equipment, complex packaging equipment and home power tools. Also under consideration are automatic merchandising equipment, air-conditioning and atmosphere control components, industrial and public utility electrical equipment, and textile chemical specialties. The company will continue to be essentially a loom making firm.

Machine Tool Firm Names Agent

Van Norman Co., Springfield, Mass., manufacturer of machine tools, appointed Garco Machinery Co. Inc., Cleveland, as its representative in the northeastern Ohio area.

Sturdi-Bilt To Move Offices

Sturdi-Bilt Steel Products Inc., Chicago, will occupy a new office building at Campbell avenue and Peterson avenue, Chicago, about Mar. 31. The company makes work benches, work-bench tops, tool racks, work-bench lights and bench power strips and other shop equipment in its Quincy, Ill., plant and a recently opened plant near Monmouth, Ill.

Bert Knight Leases Plant

Bert Knight Co., Los Angeles, leased a factory building at 4312-16 W. Jefferson Blvd., that city.

DeBothezat Widens Territories

DeBothezat Fans Division, American Machine & Metals Inc., East Moline, Ill., extended the territory covered by its representative, J. M. Pettingell Associates, Boston, to include the state of Rhode Island. The territory of A. H. Burnap, Syracuse, has been increased to include the Albany-Schenectady area.

Yale & Towne Expands

Production of school hardware products will be increased substantially

TO SUPPLY the requirements of the unprecedently high volume of school construction anticipated this year, estimated at more than $2,250,000, Yale & Towne Mfg. Co., New York, is expanding its production of locks and door closers made in four of its plants. These plants are located in Stamford, Conn.; Salem, Va.; Gallatin, Tenn.; and Lenoir City, Tenn.

In addition to the vast sums expected to be spent on new school construction, "communities throughout the United States will spend another $500 million to $700-million on remodeling and rehabilitating existing schools," says James D. Young, general sales manager of the firm's Lock & Hardware Division.

Yale & Towne's expanded line of school hardware products include built-in locker locks, miscellaneous hardware and door closers in a variety of finishes in aluminum, brass and bronze.

Sets Up Research Department

Borg-Warner Corp., Chicago, established a market research department headed by John A. Drake, director of market research. Activities of the department are to supplement and augment the market research operations of the corporation's various divisions.

Rheem May Acquire Firm

Rheem Mfg. Co., New York, may enter the automotive equipment field in Southern California by negotiation to acquire United States Spring & Bumper Co., Los Angeles.

Rheem would operate U. S. Spring & Bumper as a subsidiary, with John B. Rauen Sr. continuing as president. The Rauen family, which controls more than 70 per cent of the U. S. Spring & Bumper common stock, has agreed to accept the Rheem offer.

Rheem, a producer of steel shipping containers and automatic storage water heaters, would broaden its product line by this acquisition. The company currently operates 26 manufacturing plants in the United States and abroad.

Chrysler Producing Propellers

Chrysler Corp., Detroit, has begun producing propellers at its San Leandro, Calif., plant. Produced under license from Hamilton Standard Division, United Aircraft Corp., East Hartford, Conn., the propellers will be used on the Navy and Air Force four-engine Boeing "Stratocruiser" transports. The propeller operation is housed in a new manufacturing building alongside the Dodge assembly plant.

Stoody Co. Names Distributors

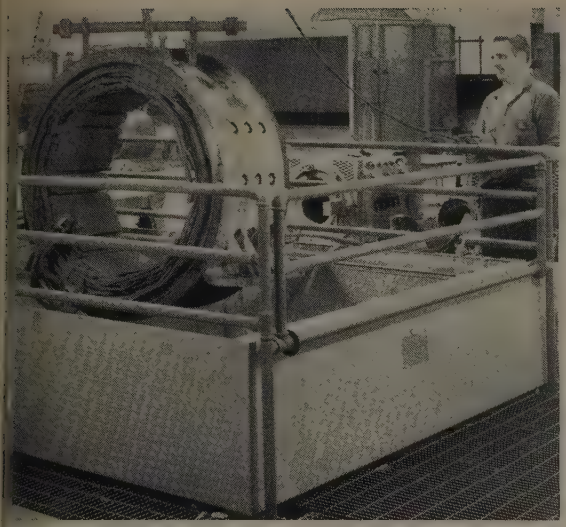
Stoody Co., Whittier, Calif., appointed the following distributors for its hard-facing alloys: Consolidated Welding Supply Co. and Phoenix Welding Supply Co., Phoenix, Ariz.; Laird Welding & Mfg. Works, Merced, Calif.; Welding Service Co., Savannah, Ga.; Waterville Welding Supply, Waterville, Me.; General Distributing Co., Butte, Mont.; Quanrud, Brink & Reibold Inc., Glendive, Mont.; McRary & Son Inc., Asheville, N. C.; Welders Needs Inc., Toledo, O.; West Texas Welder's Supply, Midland, Tex.; and Taylor-Simpkins Inc., Monahans, Tex.

Morse Expands Sales Setup

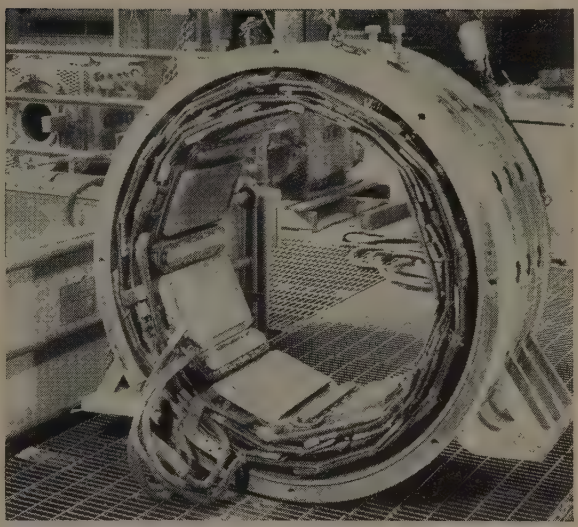
Morse Chain Co., Detroit, broadened its nationwide sales organization. A midwest sales territory was established with headquarters in Overland Park, Kans., with C. B. Lane in charge. R. J. Donachie was appointed manager of the firm's Philadelphia office with headquarters in Bala-Cynwyd, Pa.

Bryant Opens Sales Offices

Bryant Chucking Grinder Co., Springfield, Vt., manufacturer of internal grinders and boring machines, opened three new sales offices in the following cities: Mt. Vernon, N. Y., under Nick A. Leyds, district manager; Dayton, O., under Caleb C. Brown, factory representative; Indianapolis, under the direction of Walter Augusten. The firm appointed Bernard C. Day



GENERATOR STATOR is lowered into degreaser. Grime on intricate armature wiring is quickly dissolved by "Triclene" D vapors.



AFTER 5 TO 10 MINUTES the generator stator is removed from the degreaser thoroughly clean and completely dry.

Vapor Degreasing with TRICLENE® D

(*Trichlorethylene*)

cuts cleaning time from hours to minutes

Many industries are saving valuable man-hours in metal cleaning by vapor degreasing with Du Pont "Triclene" D. In the railroad industry, for example, "Triclene" D completely dissolves dirt and grease from traction motor and generator parts in 5 to 10 minutes. The same job used to take 4 *hours* with two men working together!

Another tough job was cleaning the wheels on diesel locomotives—requiring 8 man-hours by conventional methods. Vapor degreasing with "Triclene" D does it *more* thoroughly in just 10 minutes! And so the list of examples could be continued in many industries, where the vapor degreasing process teamed up with "Triclene" D saves time and labor.

"Triclene" D is specifically designed for vapor degreasing and is the result of over 20 years of research by Du Pont—pioneer manufacturer of chlorinated hydrocarbon solvents. You'll find proof of this experience and know-how when you see "Triclene" D at work. It's a pure and stable solvent—at its best on industry's toughest cleaning jobs. And experience does the talking when you call in a Du Pont technician . . . his grasp of metal cleaning problems is unique in the field.

Get the full story of vapor degreasing with "Triclene" D by mailing the coupon below, or calling our nearest district office.

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- ☐ "Metal degreasing—standard practices."
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Billets Peeled at 20', 30', even 40' Per Minute!

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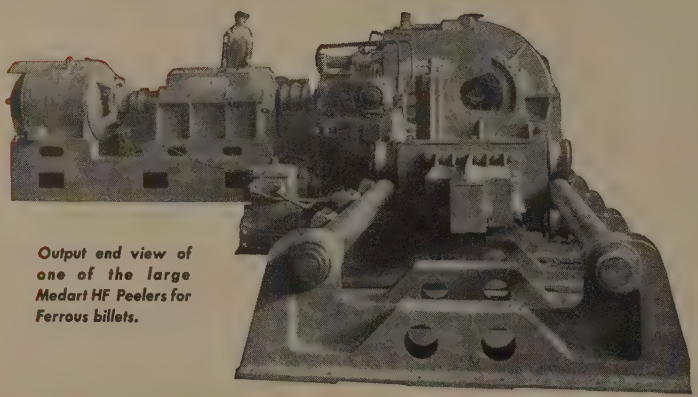


Output end view of one of the large Medart HF Peelers for Ferrous billets.

- The output of Medart Billet Peelers is limited only by the capacity of the best available cutting tools! That means the absolute maximum in production at the lowest possible cost!
- Built to handle both ferrous billets from 1″ to 14″ diameter—as well as brass, copper, aluminum and other non-ferrous metals.
- Throughput speeds of these Medart Peelers range from 1′ to 40′ per minute, depending upon workpiece size and material.
- Can be equipped with either one or two cutterheads—arranged for high surface finish or heaviest hogging cuts.
- Furnished with hydraulic or pneumatic controls, with push-pull feed devices, and for completely automatic operation.
- No other scalping or turning machines made can match the production speed or economy of Medart's complete line of Billet Peelers.

Write Now For Catalog!

THE MEDART COMPANY 3535 DE KALB STREET ST. LOUIS 18, MO.

as manager of the Cleveland office.

Ekco Buys Autoyre Co.

Ekco Products Co., Chicago, purchased Autoyre Co., Oakville, Conn., maker of stamped bathroom, kitchen and closet accessories. Ekco makes housewares, cutlery, bakers' and confectioners' tinware tools.

Valve Firm Moves Offices

Golden-Anderson Valve Specialty Co. moved its general offices to larger quarters at 1232 Ridge Ave., Pittsburgh. Production facilities have been enlarged for the production of valves.

Beryllium Corp. Names Agent

Beryllium Corp., Reading, Pa., appointed Albert W. Pendergast Safety Equipment Co. as Philadelphia regional distributor for its beryllium-copper safety tools.

Poe To Represent Insul-Mastic

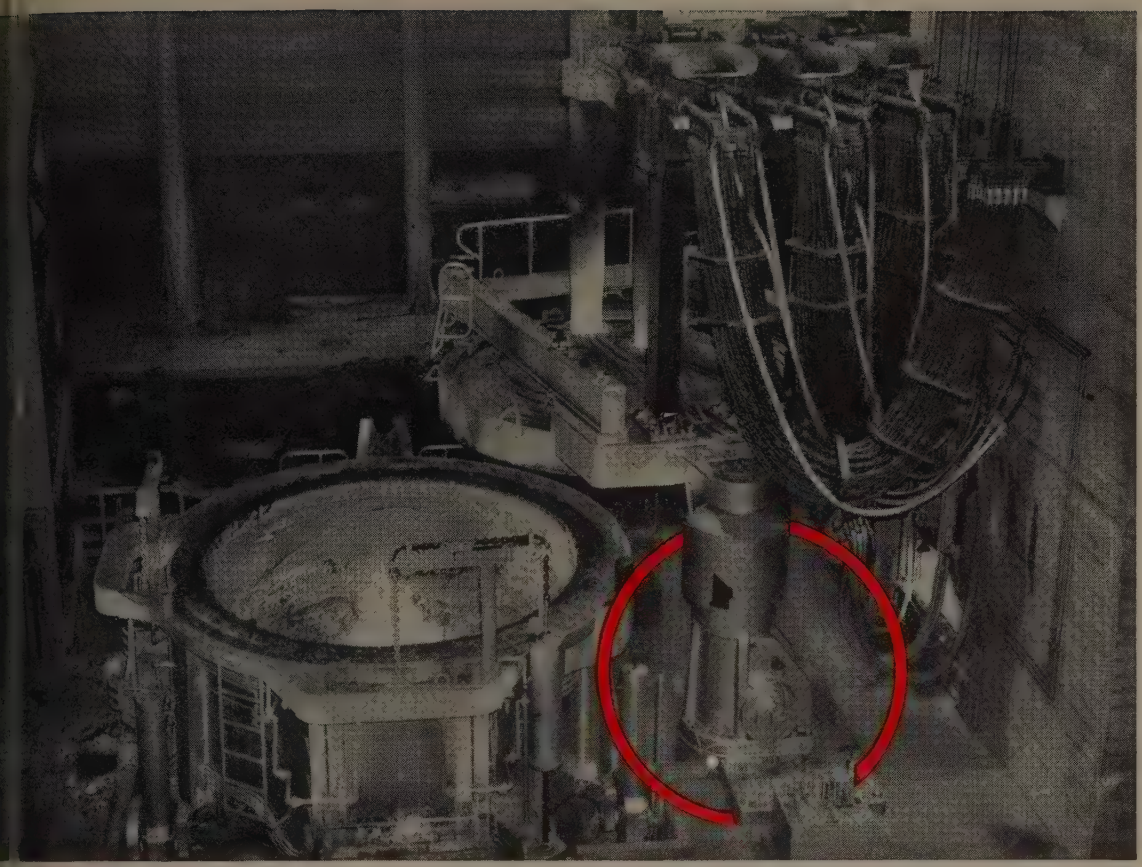
C. W. Poe Co., Cleveland, has contracted to sell and apply protective coatings manufactured by Insul-Mastic Corp. of America, Pittsburgh.

CEC Instruments Opens Office

CEC Instruments Inc., sales and service subsidiary of Consolidated Engineering Corp., Pasadena, Calif., established a district office at 615 Griswold St., Detroit. The corporation makes electronic measuring and control instruments. The new office is headed by Phillip A. Wilner.

Army Shifts Tool Procurement

Garage equipment and certain other maintenance tools, required by all branches of the armed forces, will be procured on a nationwide basis by the Rossford Ordnance Depot, Toledo, O. This equipment, consisting of battery chargers, gas and electric welders, frame straighteners, timing lights, electrical and other test equipment, was procured previously by the Ordnance Tank-Automotive Center, Detroit. Among items not



Its swinging roof has its feet firmly planted on the ground

You swing a lot of weight—and fast—when you open a Lectromelt* Furnace for charging. But that weight is carried on a foundation completely independent of the furnace itself, so the support is rigid and there's no strain on the shell.

Because every ounce of the sturdy top structure of a Lectromelt Furnace rides on massive oil bearings, it swings aside easily and smoothly. No chatter to shake roof bricks loose.

This combination helps make Lectromelt electric arc furnaces the best choice for melting, refining, smelting and reduction. For more details on these furnaces, write for Catalog No. 8. Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

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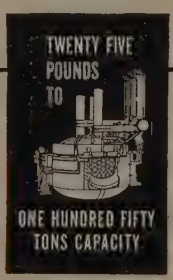
WHEN YOU MELT... MOORE RAPID *Lectromelt*



affected by this transfer order are special purpose maintenance tools, such as engine stands and cradles, reamers, pullers, slings, road wheel lifters, and other equipment which has been designed by the Army to do specific repair jobs. These items will continue to be procured by the Center in Detroit.

Equipmentmaker Opens Branch

Perkin-Elmer Corp., Norwalk, Conn., equipmentmaker, opened a sales and service office at 230 N. Michigan Ave., Chicago.

Wojtul Gets Institute Post

P. P. Wojtul, vice president, Continental Can Co., New York, assumed chairmanship of the marketing advisory board of Can Manufacturers Institute, that city. He succeeds L. W. Graaskamp, vice president, American Can Co., New York.

Adamas Appoints Agents

Adamas Carbide Corp., Kenilworth, N. J., manufacturer of standard carbide tools, tool tips, dies and wear parts, appointed Nelson R. Church Co., Pawtucket, R. I., and Allied Carbide Products, Willow Grove, Pa., as its representatives in their respective territories.

Cleveland Firm Gets Agencies

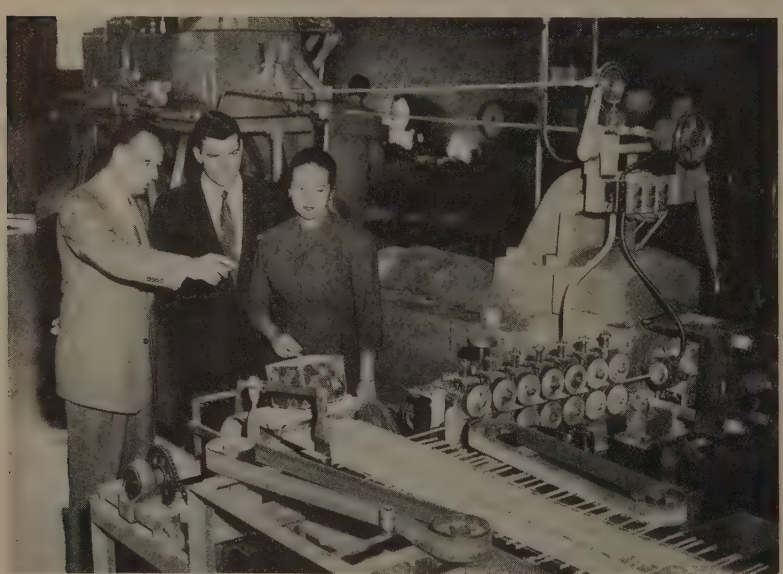
Production Service Co., Cleveland, was appointed distributor in northern Ohio for Peninsular Grinding Wheel Co., Detroit, and Waukesha Tool Co., Waukesha, Wis.

Enameling Firm Opens Plant

Mound Infra-Red Enameling Co., 25986 Mound Rd., Center Line, Mich., placed its new building and facilities for rust-proofing, painting, enameling and phosphate-coating of steel into operation.

Northrop Completes Project

Northrop Aircraft Inc., Hawthorne, Calif., completed a new production flight testing facility at the U. S. Air Force jet test center, Palmdale, Calif. The installation will be used to flight test Scorpion F-89D all-weather interceptors before delivery to the U. S. Air Force. Thomas McCracken, assistant administrator of Northrop's Ontario, Calif., base, will direct the new installation.



Arc Welding Electrodes Emerge from Extrusion Press

E. J. Brady, president, Alloy Rods Co., York, Pa., is shown, left, explaining the operation of an extrusion press used in manufacture of arc welding electrodes. This machine is installed in the firm's Pacific Coast Division manufacturing plant at 750 Lairport St., El Segundo, Calif., which was dedicated last month. George M. Hohmann is plant manager of the facility which serves 11 western states

Consolidates Scrap Activities

Eastern Scrap Co., Baltimo consolidated its yard activities 113 North Kresson St., with th at 1425 Eastern Ave. Louis K is a partner.

Will Boost Output of Wire

North American Philips Inc., New York, is adding 22,0 sq ft of space to its Lewiston, M plant. The firm is stepping up pr duction facilities for its wires a rods of tungsten and other re metals, used mainly in electro devices.

Librascope Buys St. Paul Firm

Librascope Inc., Glendale, Cali subsidiary of General Precision I strument Corp., New York, pu chased the Minnesota Electroni Corp., St. Paul, maker of digit computers and components.

Process Mold Co. Moves

Process Mold Co. moved its o fice and plant to 19665 Schoe herr Ave., Detroit.

U. S. Steel Forms Subsidiary

United States Steel Cred Corp., a newly formed subsidia of United States Steel Corp., Pitt burgh, is designed to strengthe the competitive position of Unit States Steel Homes' dealers b providing construction financin and assistance in the marketin of mortgages on erected house Officers of the new subsidiary i clude William H. Lang, assista treasurer of United States Ste who will be president and treasu er; Benjamin L. Rawlins, secr tary of United States Steel, a secretary; C. B. Vernooy, assis ant comptroller of United Stat Steel, as comptroller. Richard Dyas, who has been assistant treasurer of United States Ste is general manager of the ne subsidiary and is in charge general operations with headqua ters at 71 Broadway, New Yor Harry R. Black, who has be vice president and treasurer United States Steel Homes In New Albany, Ind., becomes assis ant general manager.

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You don't need an electronic computer to prove the economy of SuVeneer Clad Metal. You can easily figure your fabrication profits from this money-saving fact: a given thickness of copper-on-steel costs less than solid copper. Specify SuVeneer Clad Metal wherever you must have a copper (or brass) *surface*—get the inner strength of steel as a performance bonus. Write for design data and application counsel, today!

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CORPORATION
RNEGIE, PENNSYLVANIA

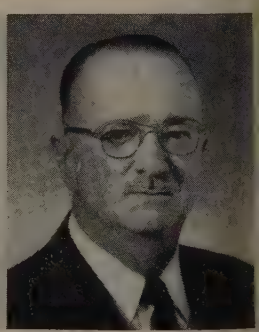
Jones & Lamson Tells: How a Jet Engine Manufacturer Reduced Labor Costs 85%

Highlights of this Report:

- Because the "Christmas Tree" form at the holding end of jet turbine blades must withstand intense heat and stresses, the material of which it is made is, of its very nature, nearly unmachineable.
- Using conventional grinding methods, the manufacturer was producing only 5 parts per machine per hour.
- The manufacturer sent a delegation of key production men to J&L with this problem.
- These men saw the sensational results of J&L's research, with on-the-floor production demonstrations.
- By using J&L data, techniques and tools, the manufacturer stepped up production more than seven-fold — from 5 to 38 parts per machine hour.

"This is only one of the many case histories in our recent experience which illustrate how advanced tools and techniques are solving some of today's toughest problems."

CARL A. JOHNSON
Manager of Sales — Grinder Division
Jones & Lamson Machine Company



PRODUCTION P.S. STUDIES

This same manufacturer, by applying data gained at one of J&L's periodic "Production Studies" Seminars, achieved a 49% increase in cutting tool life, and reduced cutter grinder personnel from 200 to 100.

JONES & LAMSON MACHINE COMPANY

517 CLINTON ST., SPRINGFIELD, VERMONT, U. S. A. • TURRET LATHES • FAY LATHES
THREAD & FORM GRINDERS • OPTICAL COMPARATORS • THREADING DIES

Technical Outlook

LUID CELL FORMING— You can expect to hear a lot of talk about the new Wheelon press. Two reasons why: Uniform operating pressures (normally 5000 psi) on all parts of the work make for more complete forming and less hand forming. Secret of its success is a bag or fluid cell above the working pad. When the cell is inflated with hydraulic fluid, it displaces the pad down over the work. Developed by Douglas Aircraft Co. Inc., it is being made under license by Verson Allsteel Press Co., Chicago.

ONGER-LASTING BATTERIES— A battery to start your car easily come the Winter's coldest morning, and one that will last four or five times longer than available types, is about to reach the civilian market. But the price will match its endurance: About five times that for a lead type. The nickel-cadmium storage battery has been produced exclusively for the armed forces for the past four years.

URFACE GRINDING TITANIUM— Practical recommendations for surface grinding titanium alloys include a white type of aluminum oxide abrasive, grit size 60, wheel speed of about 2000 fpm and water-base cutting fluid containing ionized salts of the alkali and heavy metals. For example, a barium nitrate solution gave particularly good results.

APPLYING ATOMIC ENERGY— Caterpillar Tractor Co. has announced plans to use products of atomic energy in its research work. The company says radioactive materials will be used to accelerate longtime endurance tests on parts to get test results not obtainable by more conventionable methods. Parts tested will be sent to Oak Ridge to be made radioactive. Caterpillar's first step in working with atomic energy will call for relatively low levels of radiation intensity.

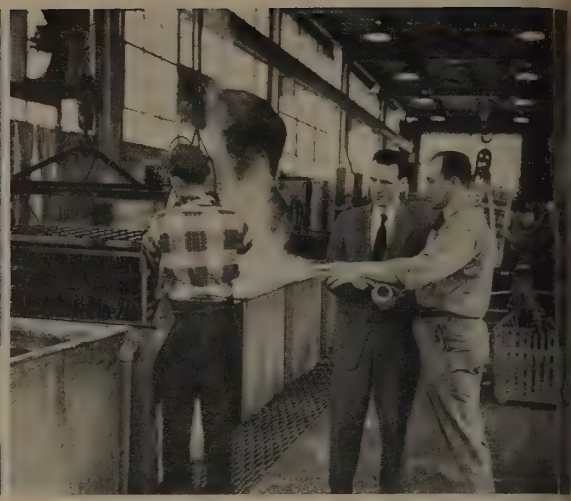
STRENGTH GROWS— Rare earths combined with an injection system of calcium carbide and magnesium oxide are being developed to produce both a nodular iron and a high strength iron. This high strength iron has promise of wide industrial use. Economics of the process look most favorable says Norman F. Tisdale, vice president-sales, Molybdenum Corp. of America. His company has some 18 million tons of rare earths ore developed.

LIGHTING TREND— Experts on vision say upward component lighting (from 20 to 30 per cent of the light hits the ceiling) makes for more comfortable seeing and a pleasanter working environment. Reason is that there is no harsh brightness difference between luminaires and dark ceilings. Under certain conditions, maintained footcandles can be higher with upward component equipment, according to Westinghouse.

CONCENTRATING RESEARCH— Emphasis on concentrating research activities is illustrated by moves contemplated or under way by two Cleveland firms. Already on top of innumerable technical developments, Thompson Products Inc. reports it will locate a $5 million engineering center near its big Tapco plant in Euclid, O. Plans of Eaton Mfg. Co. call for a $1.5 million research center on 30 acres of land it optioned in Bratenahl, another suburb.

alworking Outlook—p. 65 Market Outlook—p. 173

Severe backward extrusion, as shown above, is a process that requires the benefits of optimum lubrication



Components are transferred from one immersion tank another during the running of their phosphating cy

Coatings In Cold Forming

DUAL ROLE MAKES LUBRICANT DOUBLY IMPORTANT

Lubricants have a tough act in severe cold forming. Phosphate combinations are achieving important success in twin function of surface separator and friction reducing agent

By DR. SAMUEL SPRING
Pennsylvania Salt Mfg. Co.
Philadelphia

LUBRICANTS must play a double role in severe cold forming of metal.

They must act as a physical separator to prevent surfaces from coming to within molecular distance of one another, because this results in immediate welding. They must also reduce rubbing friction so surfaces may slide over one another with minimum effort—in itself the over-all function of a lubricant.

Many lubricants are available that contribute substantially to both functions. These have been applied successfully when conditions of cold forming are not too severe, as is the case in many stamping operations, or in drawing hollow bodies where there is relatively little ironing or metal flow between tool surfaces.

However, for severe cold forming, and particularly in extrusion, there is no single lubricant that can perform both functions adequately, although one may contribute to both.

Lubricant Breakdown — Surface welding is a consequence of lubricant breakdown. If metal surfaces come sufficiently close together, the same attractive forces that hold metal together can operate on one another. Molecules have the same relationship as those in the bulk of the metal, and a coherent piece of metal is formed.

A major factor preventing welding under most conditions is lack of metal surface smoothness. However, high spots can be deformed plastically under the influence of pressure to increase area of contact (Table 2). Since plastic flow of metal is at a maximum in extrusion or severe ironing, tendency for contact and welding is also at a maximum—and so is the lubrication problem.

Metal Pick-up—Where welding has occurred, one surface can e moved over another only by te ing the metal at these points exceeding its tensile strength, process demonstrated by Brit physicists[1]. Tearing occurs cl to the original weld area, leavi an initially submicroscopic quant of metal on the tool. The proc can continue until microscopic p tions of metal on the tool are e dent. Picked up metal then sco or scratches the work.

Thus, separation of surfaces essential to adequate lubricati Oxide, rust and general dirt f quently serve this function, b high shearing stresses and t contact area in extrusion requ something anchored securely the work surface.

Addition of Fillers—Several l ricants have been used to sup proper physical separation. One volved addition of fillers or p ments to the lubricant so they a

ed between metal surfaces to nt intimate contact. Fillers types that fragment under sure, such as finely-divided or lithopone, and those that weak cleavage planes so slip- takes place within the par- s. Examples of the latter are hite and talc.

e of a filler requires entrap- of the particles—by no means tain procedure. This uncertain- an be reduced greatly if the rator is attached to the work ace.

uctile Metal Coatings—Further t involved deposition of duc- metal coatings over steel. Cop- deposited by galvanic action mewhat effective. Even better electro deposited copper or lead ings. But, these coatings are ally impractical because of cost siderations.

an effort to obtain films that ld be maintained on the sur- by stronger bonding forces, ex- e pressure lubricants have n used. These contain sulphur chlorine, which react with the al surface to form a very thin of sulphide or chloride. Chem- reaction involved, however, re- es heat generated by the draw- operation. Thus, a portion of operation takes place without efit of film and there is limited e for reaction. Result is reduced ulness of the materials. Iron hide films are somewhat more ctive, but very difficult to con- and messy to apply.

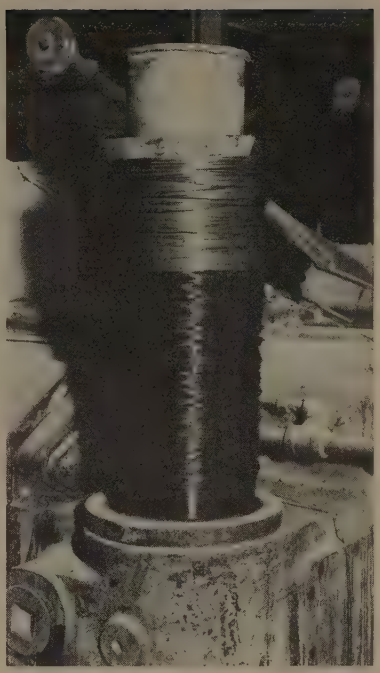
inc Phosphate — Properly ap- d zinc phosphate coatings are ed admirably to this type ap- ation. Phosphatizing for severe ning involves formation of a substantial deposit of crystalline metal phosphate, strongly attached to the surface. This is accomplished by contact of a hot zinc phosphate solution in phosphoric acid for 2 to 7 minutes, rinsing, then immersion in an oil or emulsion lubricant. Zinc phosphate coating's crystalline nature can be seen in Fig. 1, representing the magnification of a plastic replica or Fax-film of such a surface.

Porous nature of the coating is advantageous because it permits a quantity of organic lubricant to be absorbed in the porous matrix. This is released as the metal goes through the die, thereby providing lubricant where it is most needed during drawing.

Formation, Adherence — First step in forming the phosphate coating from the chemical solution involves a pickling action of the acid on the steel. Effect is to reduce acidity in the layer of solution next to the steel surface. This upsets the equilibrium between zinc phosphate and acid to such an extent that the phosphate is ready to be thrown out of solution.

If this reduction in acidity takes place rapidly, the zinc phosphate precipitates as a white powder. However, if this equilibrium is shifted gradually, as is the case in commercial phosphatizing, the phosphate will deposit on the steel instead of in the solution. The latter action is particularly true where some portions of the surface are receptive.

In application of phosphate coatings to severe cold forming, crystal size is of little importance, within reasonable limits. More important than crystal size is adherence of the deposit to the steel surface. This is governed to a great extent by intertwining action of the zinc phosphate crystals and adherence of the basic layer on which the zinc phosphate has deposited. If crystals deposit on particles that are not adherent to the metal surface, the coating may be thicker but would not remain on the steel surface under high shearing stresses at the die. For this reason, an excessive amount of pickling smut or



Uniform, scratch-free wire on lower portion of spool was phosphate-coated before drawing for greater speed, better die life. Nonuniform wire surface at spool's top was treated with lime

TABLE I

COEFFICIENT OF FRICTION

Steel on Steel	Coefficient of Friction
Fluid-bearing lubrication	0.001 to 0.01
Fatty acid film lubrication	0.06 to 0.12
Ordinary dry surfaces	0.16 to 0.26
Fresh abraded surfaces	0.43 to 0.58
Cleaned and outgassed surfaces	1.0 to 2.0
Copper on Copper	
Freshly abraded	0.6
Cleaned and outgassed	5.7

TABLE II

AREA OF CONTACT BETWEEN GROUND AND LAPPED SURFACES

(21 sq cm area)

Load	Fraction of Area in Contact
500 kg	1/400
100	1/2000
20	1/10,000
5	1/40,000
2	1/100,000

burned drawing lubricant should be avoided.

Deformation—During the deformation process, the inorganic phosphate film must be deformed as well. Here, zinc phosphate is superior to other phosphates (Table 3). It must be considered, however, that the phosphate coating is not very ductile. Due to a strong binding force, it remains in position during the deformation process. Some work is required to deform the coating. This is minor in comparison with the reduction of friction due to effective welding prevention afforded by the films.

The coating is converted into a glassy condition during its passage through the die. The glassy coating is of particular interest because it has been found possible in many cases to draw metal a second or third time and still retain metal parting properties as well as lubrication, due to the organic lubricant present. This is possible only if the lubricant is sufficiently thick prior to the first draw.

The glass-like coating that remains can be removed by a mild pickling operation or by an alkali treatment. It may be permitted to remain on the metal surface after superficial degreasing and thereby provide a measure of corrosion resistance, in addition to a glossy surface.

Organic Lubricant—An organic lubricant is employed in conjunction with the phosphate coating. Two types may be defined: A solution of soaps prepared from high melting fatty acids and an emulsion of fats and fatty oils dispersed by a soap solution in an excess of water. In both cases the lubricants are used hot and most of the water present evaporates. Remaining is a hard and somewhat brittle film in the former case, a greasy film in the latter. Both types have been applied successfully to severe cold forming operations, but the best have been compromises between the two.

Whether used with phosphate coatings or not, the extremes of each type function by an entirely different mechanism.

Type I Lubrication—An excellent type of lubricant for many metal drawing operations can be achieved by use of bone dry plastic films obtained from certain soap or wax dispersions. These films apparently operate on the basis of physical properties, and their chemical makeup is important only insofar as it provides proper properties. Studies indicate that a good lubricant of this type should have a melting or free flowing point about 20°C higher than the gross tool temperature[2].

It also appears that there must be a gradual die entrance angle when lubricants of this type are used on bare metal because of their poor resistance to being stripped off. There is reason to believe that this is not nearly as critical when they are used with phosphate coatings which improve lubricant coherence. One hypothesis holds that this type of lubricant operates by being drawn between the tool and work surfaces where it is liquefied by increased temperature. Because of limited clearance ahead and solid plug of unmelted material behind, the molten lubricant acts as a hydraulic fluid and provides so-called fluid lubrication which is far superior to other types (Table

In support of this, we have found that plastic, dry-film lubricants permit drawing with much lower frictional forces than good, conventional lubricants[3]. In addition these lubricants are converted into a glass-like form during passage through the die.

Cooling Action — Where a dry film lubricant is used in drawing, cooling action characteristic of wet lubricants is not available. This frequently causes concern, particularly on the part of people who have grown up with the liquid lubricants. These dry film types have been used for several years, and there is little question but that there is no effect on the tools themselves due to the heat generated during the drawing operation.

Actually, tool temperature is somewhat higher than that obtained with wet lubricants. But this reaches a level estimated

TABLE III

APPARENT COEFFICIENT OF FRICTION OF DIFFERENT PHOSPHATE COATINGS

(at 200,000 psi)

	Coefficient of Friction
Uncoated	0.070
Zinc phosphate	0.043
Manganese phosphate	0.066
Cadmium phosphate	0.055

TABLE IV

INFLUENCE OF SOAKING TIME ON APPARENT FRICTION OF SURFACES

Unit Pressure	Time	Temp.	Coefficient of Friction Phosphated	Uncoated
10,000	few seconds	85° F	0.070	0.114
10,000	one hour	160° F	0.013	0.108
50,000	few seconds	85° F	0.076	0.081
50,000	one hour	160° F	0.032	0.068
100,000	few seconds	85° F	0.066	0.086
100,000	one hour	160° F	0.043	0.057
200,000	few seconds	85° F	0.062	0.084
200,000	one hour	160° F	0.043	0.070

Fig.

Fig. 2

G sy condition of phosphate coating after passage th gh die is seen in Fig. 2—a plastic replica of phosphated surface after drawing. This is compared with Fig. 1 — zinc phosphate in crystalline condition

a ut 300 to 350°F, then stays t e. Obviously this temperature i oo low to have any effect on t temper.

here are times, especially with s ller parts, where dimensional d erence between cool and hot t s may change tolerances. In s h cases it is desirable to h e a cooling action. This may b done by using a water-base cool- a if the dry film lubricant is in- s uble in water, or a very light c where soaps are used to provide t s film.

Type II Lubrication — Second t e of lubrication involves ad- s ption of polar portions of the l ricant on the metal surface. h is may be seen in Fig. 2, in w ich a material, such as a fatty d, with an electrically-active or p ar group reacts with the metal r face. Under this circumstance, r ative motion between surfaces t es place at the hydrocarbon or n polar tails of the lubricant lay- which offer much less resist- ce to motion than contacting t tal surfaces.

In practice, these boundary lubri- nts function by buildup of many l lar lubricant layers held togeth- by relatively weak attractive r ces. They are very good lubri- nts as long as conditions tend- g to force metal surfaces togeth- are not sufficient to displace e film.

Polar lubricants can build up to yers of 1000-molecule thickness. ubrication of the first type de- ribed could occur if the buildup aterial is thick enough and has correct physical properties, such as melting point. This may be the case for soap-type lubricants applied on a zinc phosphate coating. Reaction of zinc and fatty acid to form a zinc soap, possibly followed by deposition of additional layers of soap molecules, yields a fairly thick coating. The latter represents close to an ideal setup. Low coefficient of friction that can be obtained by Type I lubrication may be achieved at the same time as the superior adherence, at least at the bottom layers, characteristic of Type II.

Successful Combination—It appears that the combination of both types is operative in lubricants most successful in cold extrusion and processes of similar severity. This is based on a study of the lubricant's composition and general performance. They are designed to yield a relatively thick film of material deposited by evaporation of the water, which serves as a vehicle.

However, lubricant composition is such that it can react readily with the zinc phosphate coating to form a soap. Held on the surface by strong chemical forces, it serves as a receptive base for the mechanically-deposited lubricant. Two other factors exert an influence: Time of contact with the lubricant and pretreatment of the zinc phosphate to facilitate reaction.

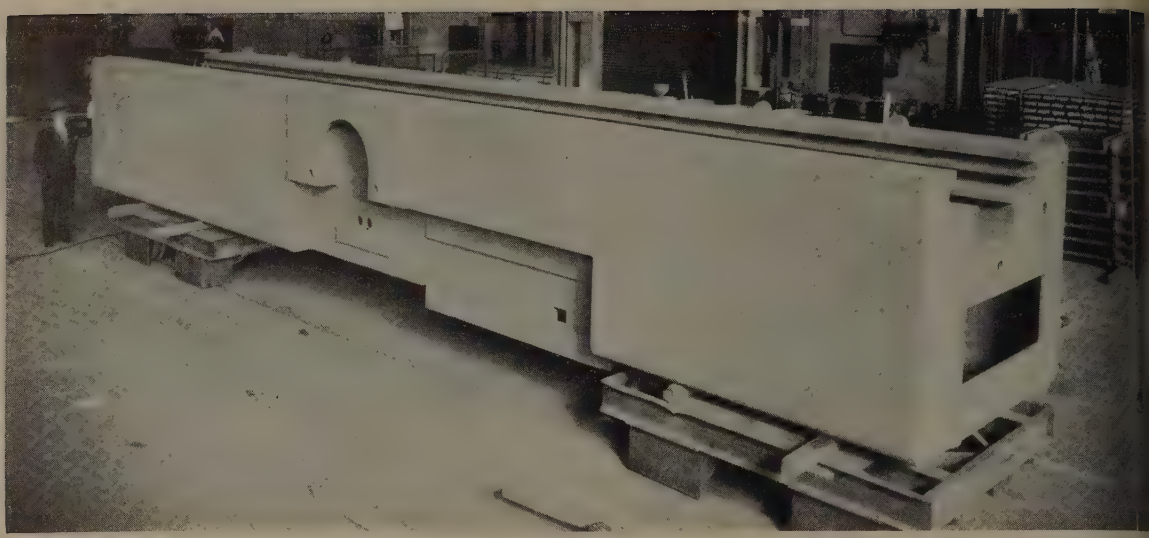
Facilitating Reaction — Because deposition of a multilayer film of soap molecules is a function of time, longer immersion time gives superior lubrication (Table 4). It is usually determined by the maximum time allowable in the processing cycle, but an effort should be made to use the maximum available soaping period.

Another technique that can be used to facilitate reaction between the lubricant and the phosphate coating involves a chemical rinse prior to lubricating. A rinse modifies the zinc phosphate coating so it forms more ions that can react with soap.

Assisting Lubricants — While the phosphate coating, plus a suitable organic lubricant, is adequate for most extrusion applications that have been investigated, there are times when the operation is of such a nature that an additional lubricant offers assistance. Here it has been observed that the addition of graphite or molybdenum disulfide, particularly the latter, is effective. These materials act as separators by entrapment between the surfaces. They also possess weak cleavage planes, at which relative motion can take place.

Particles can break up the slide over one another readily. Thus rubbing friction can be reduced by this movement at the weakest portion of the system within the lubricant, rather than at the base metal or phosphate coating. Molybdenum disulfide works best when applied as a powdered solid rather than as a dispersion in an oil vehicle.

1. Bowden and Taylor—*Friction and Lubrication of Solids*, Oxford, 1950, 327 pp.
2. Williams, R. C.—*Ind. and Eng. Chem.*, Vol. 27, p. 64 (1935).
3. Spring, S.—STEEL, 117 (No. 7) 180 (1945).
4. Schuster, L. K.—*Iron & Steel Engineer*, p. 67, (May 1952).



Controlling distortion was a must for this giant, all-welded machine bed

DISTORTION CAN BE DESIGNED OUT . . OF WELDED STRUCTURE

Understanding what happens in the heat-affected zones is the tipoff to effective procedures for ending warpage and upsetting. Heat can straighten distorted members, too

By J. R. STITT
Research & Welding Engineer
R. C. Mahon Co.
Detroit

HEAT is both friend and foe of the welding fabricator. Without it, fusion is impossible—with it, dimensional control gives him many design problems.

A steel member will always expand, in length, width and thickness wherever heat is applied. And there has to be heat applied in arc welding, resistance welding or any of the other fusion processes. What complicates matters is that welding heat is localized heat having a fusion zone and areas of progressively cooler metal around it.

Here's What Happens—To some extent, the natural expansion of the hotter parts is obstructed in certain directions by restraint from the cooler parts that expand less. This causes an upsetting of the hotter parts in the direction of least restraint. As welding progresses and after it is completed, the structure cools, and the hottest parts (having expanded the most and upset) contract the most to reach their resulting changed shape.

This distortion problem, compounded as welded structures become more complex, has been one of the big handicaps to the complete acceptance of welding as a universal joining method.

What to Do—Understanding the cause of distortion will help the fabricator to understand how he can minimize it with better welding design and weld sequencing. Three rules that should be observed in the drafting rooms are:

1. Wherever possible, welds should be balanced about the axes of the assembly. Distortion will be much less than with unsymmetrically located welds.
2. Design for lighter and more distributed welding instead of heavy welds concentrated in small areas.
3. Be prepared to make frequent allowances for adjusting, trimming or milling a completed welding assembly to its exact indicated dimensions. Shop management is the proper guide in this field where few general rules exist.

On the Job — The above rules should help minimize the designed in distortion problem, so let's consider the means of combatting it in the field. Assume you are making a large I beam out of three plates (Fig. 1) and you want it straight regardless of its length. It's an easy job with sequence welding.

In position 1, half of the welding that is ultimately to be made in this position is laid down. If it is to be single-pass weld, beads will be spaced so as to leave half to be done in Position 4. In this instance, since we are using two passes, the fillet welds are made complete for the entire length. In Position 2, the beam is flopped over 180 degrees and similar beads laid down. Position 3 is the same as Position 2, and the other half of the total weld at Flange A is laid down. Position 4 finishes the weld on Flange B.

How It Works—When the weld

ade at Flange B, Position 1, nkage occurs not only in the t but in metal adjacent to the l. Since there is several times volume of base metal as there eld metal, and both are shrink- Flange B shortens, giving a ber to the beam. This camber be brought back by welding ge A, Position 2.

While in the same position, ge A fillet weld is completed, ersing the camber that was set in Position 1. Rolling the beam degrees to Position 4, and ding Flange B neutralized the aber from Position 3, and the m is completed . . . and straight!

All Welds—Same system can be d whether it is a box section h four welds at the corners, or ether it has a butt weld, or uble V-butt weld welded from t two sides. In Fig. 2. Weld 1 sition 1 will fuse and give a heat ected zone plus the additional ed base metal and will tend to rink at right angles to the axis the weld, as well as lengthwise. By turning it over to Position 2, l applying Weld 2, it will tend pull across the axis of the butt ld as well as lengthwise and will ghtly distort the plate. Weld 3, sition 3, will pull the plate past raight, and when you turn it er and make the last weld, Posi- n 4, the piece will end up flat.

Other Techniques—On a recent . (Fig. 3) socket and dome piec- were to be welded to their re- ective shoe plates to form ball d socket joints at the base of lumns in rigid frames. Plates ried from 1½ to 4½ inches in ickness. In welding the thinner es, plates ended up bowed from e center to the edges. By putting ft copper wire (up to 1/16 inch ick) under the dome and above e socket pieces and tack weld- g the assemblies, the large fillet elds were completed with a mini- um of distortion.

What happened? The compres- on of that small amount of copper lowed the fillet welds to shrink rtically and greatly minimize the mount of vertical tension that ulls the plate into the cambered ape. On the thicker plates, this nsion actually cracked the welds ntil copper wire was used. No racks or distortion were encount- red in the 187 column base plates.

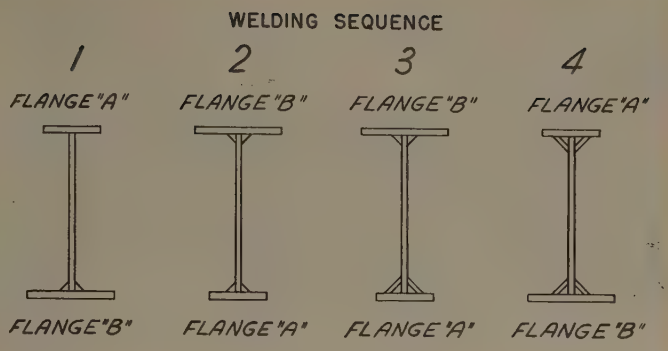


FIG. 1

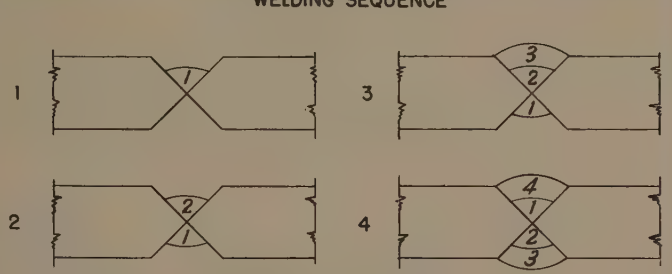


FIG. 2

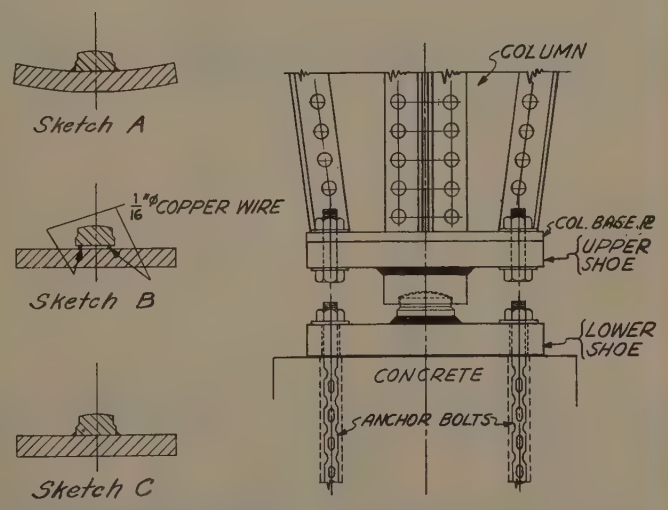
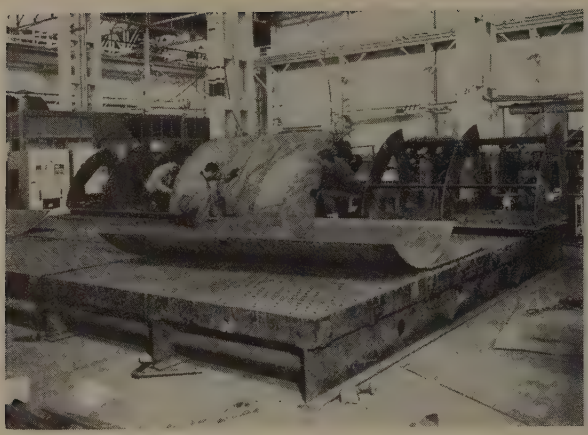


FIG. 3



Sequence welding played a big part in fabrication of these dam spillway gates

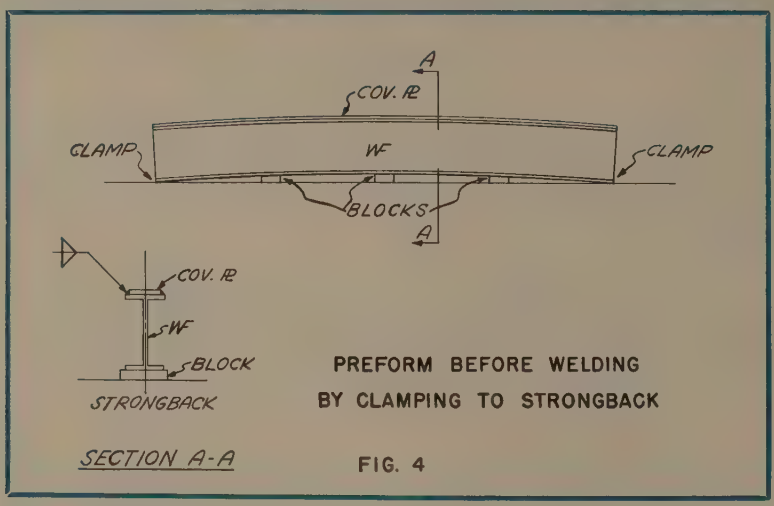


FIG. 4

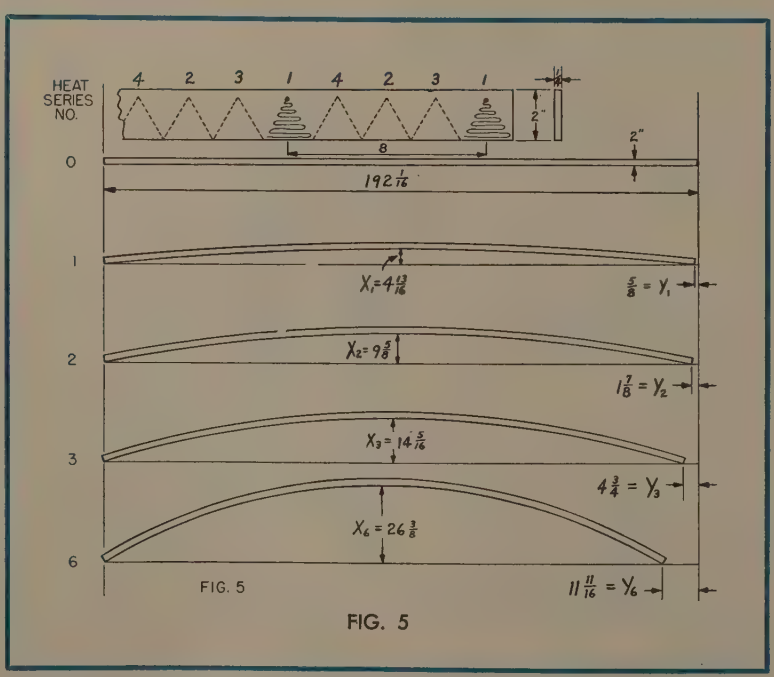


FIG. 5

welded with copper wire inserts.

Another method of attacking t distortion problem is by prefor ing the member in opposition the known direction of distortic (Fig. 4) By clamping the ends a beam to a strongback, for i stance, and bowing it with bloc placed under the central portion welding can be performed on t top flange. When the clamps a released the beam will be straigh if preforming was correct.

Flame Straightening — Up this point the discussion has dea with the various methods of min mizing distortion. What's to b done with members that are a ready distorted? They can b straightened with comparative eas by applying the knowledge gaine in studying what caused the dis tortion in the first place. If hea caused it, heat should cure it.

Feasibility of this method wa proved in some experiments where in a 192-inch steel bar, two inche wide and one quarter inch thick was bent the stiff way by applyin a series of heats as shown in Fig 5. This illustration shows deflec tion caused by 6 series of heats Actually, 18 heats were made an total deflection was 59⅝ inches.

From this position, the bar ca be straightened to its original form by applying the same number o heat series in a manner opposite t the heats that caused the distor tion. This method has worked o beams, long crane girders, welde machine beds and stands; and ha been used to advantage in straight ening structural members of fire destroyed structures.

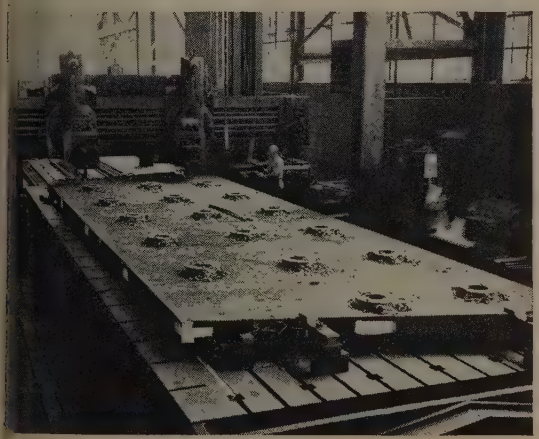
ON THE BEAM FOR AIRPOWER

URING 405,000 POUND INGOT

. required heats from two open-hearth furnaces, each of l ton capacity. This was the first step by Midvale in r king support beams for new Loewy-Hydropress designed a built 50,000 ton press for the Air Force heavy press p gram.

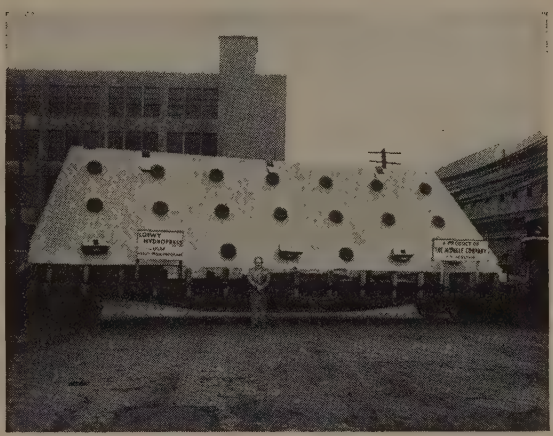
FORGING ON 14,000 TON PRESS

. . . to reduce 68 inch by 154 inch ingot to rough size and shape. Heat treated in temperature controlled furnaces to required physical properties . . . to withstand the stresses of tremendous pressures.



ACHINING 12′ x 40′ SUPPORT BEAM

. finish machining the faces of spacers on a large planer assure close dimensions and fit with eleven other support ams which make up the head of this 50,000 ton press. idvale machine tools are capable of handling rough and ish machining operations on all size products . . . large d small.



READY FOR ASSEMBLING

. . . beam is loaded on flat car for shipment. This is only one of 42 parts of similar design produced by Midvale for this press. Midvale was chosen by Loewy-Hydropress, Inc. for its complete facilities for forging, annealing, welding, stress relieving and finish machining. Why not use these facilities for your products?

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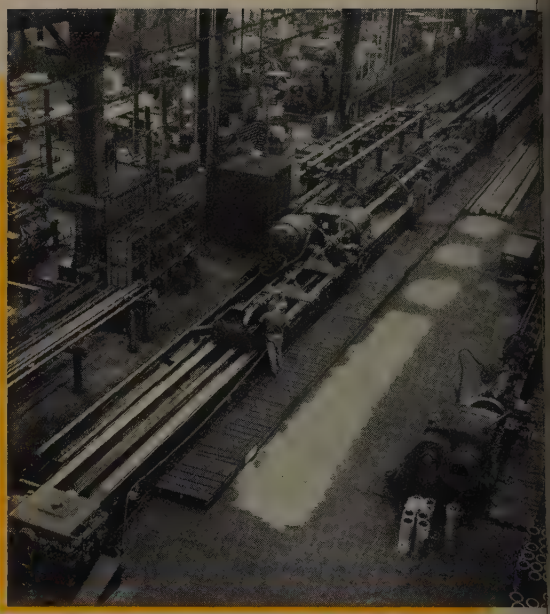
MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, STAINLESS STEEL CASTINGS

Two-Way TREPAN

Trepanning tools come in from both ends as drill collars are bored in one-tenth the former time. Collars up to 55 feet long can be handled in this double-end lathe

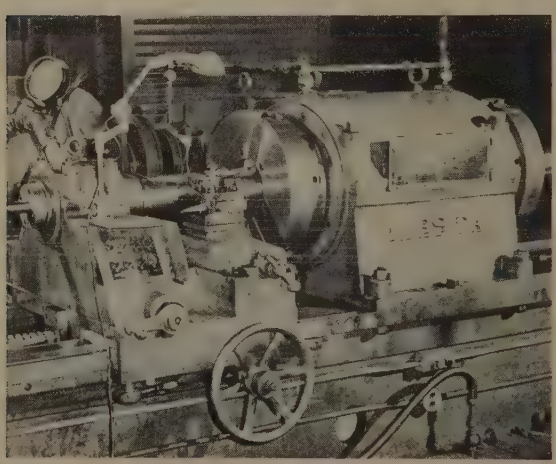


DOUBLE-END boring lathe has reduced the time required to bore drill collars, for oil field use, to about one-tenth that of the former method.

Lathe, installed at the Ambridge plant, Spang-Chalfant Division, National Supply Co., utilizes the trepanning principle in which cutting tools make an annular hole which leaves a core of steel, instead of removing all of the metal in the form of chips. Drill collars are used to give greater weight to the bit when drilling oil or gas wells, thus enabling the crew to drill or make holes faster.

Capacity—Designed and built by Mesta Machine Co. in accordance with Ambridge engineers' specifications, the lathe is 146 feet, 6½ inches long. Lathe can bore collars up to 55 feet long and up to 8 inches outside diameter.

Boring is done simultaneously from both ends. At each end, there is a trepanning head in which a ¾-inch wide carbide-tipped cutting tool is mounted, and the head is attached to a nonrevolving drive tube or boring bar. Bar is held in the tail stock. Workpiece rather than the cutting head is rotated during the boring operation.



Center control panel has switches for spindle speed and coolant pump motors

Chip Flush—Coolant or cutting oil is fed under pressure through space between the boring bar and inside diameter of the hole, serving double purpose of keeping cutting tool cool and removing chips.

Coolant pumps are located at each end of the machine, and are powered by a 25-hp motor. Coolant is fed to each boring head.

Decelerates — Rate of penetration varies slightly from start to finish. At the start of the cut when the tool is sharp, feed is greater than at the finish when the tool is dull. Hole size, spindle speed, type of tool and hardness of workpiece material also affect rate of penetration.

Spindle speed of the lathe is controlled at a panel located on the floor at about the middle of the machine. Switches for starting and stopping the coolant pump motors are also located on this panel.

A Pair — Two main control panels, one at each end of the lathe, are located at the tail stock where the boring bar is held. From these positions the operator can stop or start the main spindle and the motors which drive the feed screw.

Added advantage of the method is that the cores removed by trepanning can be used by machine shops to produce other items.

How to get the most out of

Suspended Refractory CONCRETE CONSTRUCTION

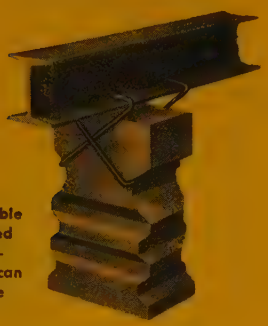
The big reason behind today's growing use of suspended castable construction is lower installation cost. The replacement of standard brick and special shapes by refractory castables (just as easy to use as structural concrete) is becoming so widespread that every furnace operator should consider it as a possible means of cutting his own installation costs.

Not only can refractory castables be handled easily, but such troublesome jobs as notching I-beams have been eliminated with B&W's patented anchor tile and "ice-tong" hanger. Maintenance patching is quicker, too, because this hanger can be slipped on or off anywhere on the beam.

But the major reason for the general preference of B&W's suspended castable construction is B&W Kaocast—the only refractory concrete for service up to 3000 degrees. Even at lower temperatures, B&W Kaocast results in longer, more economical service because it has a high resistance to spalling and practically no reheat shrinkage.

The step-by-step story shown at the right is an example of how B&W's modern suspended castable construction is used in soaking pit covers. These covers take plenty of abuse because of the rough handling they get, but B&W Kaocast stays on the job.

An example of B & W's Modern Suspended Castable Construction



Cross section of castable form showing patented anchor tile and "ice-tong" hanger, which can be attached any place on I-beam.

B&W Kaocast may be gunnited, as shown above, or poured into a form.

Cross section of finished B&W Kaocast soaking pit cover, showing anchor tile and "ice-tong" hangers.

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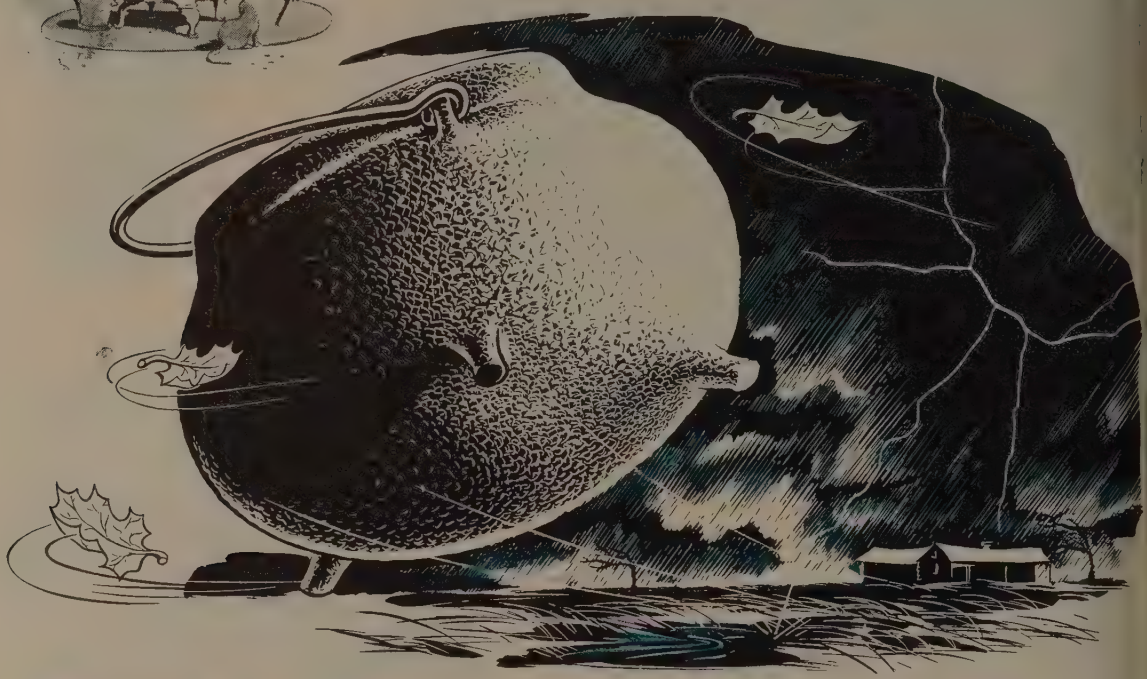
SPINS A YARN FOR **BAKER'S MAGDOLITE**



Strike Three...You're Out

"They say they have big winds in Texas. Stuff! Compared to the windstorms we have in Virginia, they would be just a gentle breeze. Show you what I mean, here's an example. The other day we got us a windstorm, with plenty of thunder and lightning, the likes of which you've never seen. There was a big, old iron kettle, we used to scald hogs in, standing out in the yard. The wind picked up that kettle and blew it across the yard so fast that lightning struck at it three times and missed."

Guess Jupiter will have to send that lightning bolt back to the "bush leagues." It doesn't quite make major league material. If you are looking for "major league" dolomite, try BAKER'S MAGDOLITE — the original dead-burned dolomite. You'll discover that BAKER'S MAGDOLITE has chemical, physical and mineralogical composition which assures you of higher ingot uniformity with reduced maintenance costs. BAKER'S MAGDOLITE is better five ways . . . Composition, Preparation, Economy, Strength, Quality.

This tale was the Champion "whopper" at the 24th Annual Convention of the Burlington Liars' Club.

JEBCO

PRODUCTS
SINCE 1889

MAKERS OF BAKER'S MAGDOLITE

8-54

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THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA

Plants: Billmeyer, York, Pennsylvania — Millersville, Ohio

table base being removed from location for repairs. o piping connections and one electrical connection all that have to be broken for moving the base

Typical six-furnace installation at an eastern annealing plant, having 15 bases to allow for continuous operation. Charge size is 48 inches in diameter by 120 high

Portable Base Brightens Annealers' Future

Design permits easy installation and maintenance of single-stack convection furnaces. Base mounts on same guide cones as furnace cover; replacement takes several minutes

HAT could well be the answer users' cry and hue for better uality annealed strip coils has en developed by the Lee Wilson ngineering Co. Inc., Cleveland. 's a single-stack radiant convec- r furnace with the added advan- ge of a portable base design.

Now when any base repairs ve to be made, the damaged one quickly lifted off and a reserve se lowered into position. Quick nnectors for electricity, thermo- uples and deoxidizing gas are signed into the portable base st as they are in the portable over. Total change time is only 5 minutes.

Hidden Savings—Portable base esign eliminates the necessity for utting basements under cover- ype furnaces since there need be o accessway for maintenance. Vith no basement, there is no eed for steel supporting struc- ures, extra concrete work. Prob- ems of flooding, cleaning and fire- roofing are eliminated.

Size of the single-stack furnace self has some advantages. Since 15 or 20-ton crane can easily handle base, covers or coils, a much lighter building construction can be used. Inherent in the smaller cranes is greater speed and mobility plus a considerable saving in maintenance cost as compared to the big cranes usually found in annealing shops.

Not New—Though the portable base idea is new, single-stack high convection annealing furnaces have been on the market since 1945. Most of them were sold to the narrow strip mills since large producers were too interested in volume production to try a furnace which, at first glance, appeared to be inadequate for their needs. But with the return to a buyers market in all types of steel products, customers are demanding and getting top quality annealed sheet and strip. Annealers are taking a second look at single-stack furnaces.

Biggest advantage is the fast and even heating of the charge, since radiant tubes heat from uniform intervals around the entire circumference of the inner cover. Multiple-stack furnaces, because of their design, can heat from only two sides, which not only means slower heating but eventual deformation of the inner covers unless they are carefully rotated in successive heats.

Fuel Costs — Proponents of single-stack furnaces point to that unit's ability to heat a given stack of steel twice as fast due to the greater radiant tube concentration. With twice the radiant tubes, twice as much fuel can be burned, releasing twice as many Btu's in any given time. In a 4-stack furnace, for instance, it is very difficult to get total heat capacity of more than 10 million Btu's and still have the heat applied around the bottom of the furnace where it is most useful. That's 2½ million Btu's per stack.

With the single stack, it is possible to apply as much as 5 million Btu's per stack. With the greater radiant tube area, tubes operate with lower uniform dispersity, thereby producing lower flue gas temperatures. This added to the lower radiation loss, shorter heating time and higher load

EF

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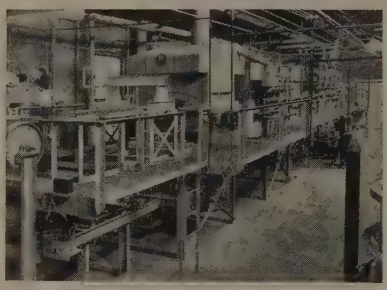
PRODUCERS and PROCESSORS
of metals and metal products

General view of the research department showing several of the continuous and batch type experimental furnaces.

● From our fully equipped research department we can determine accurately—from test runs—the combination of temperature, time cycle, atmosphere and other factors needed to produce the exactly desired result,—assuring—in advance—the efficient performance of EF furnaces **fully up to specification.**

Many large companies have drawn liberally upon this department in developing new products, and new techniques. Our facilities are available to YOU also—for YOUR research or development work, either gratis or for a moderate fee, depending upon the nature of the experiment. We will be glad to schedule time for your technicians, or write today for our 12 page booklet, "Research Facilities". It describes the equipment we can place at your disposal.



View of combination gas-fired and electric continuous furnace equipped with flame preheating burn-off or oxidizing section and controlled heating, soaking and cooling zones, for producing various surface conditions on strip.

Gas-Fired, Oil-Fired **EF** ***and Electric Furnaces***
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Inner cover being lowered over a 72 inch diameter by 156-inch-high charge showing coil resting on convecto plate. Photo above shows interior o furnace and its radiant "O" tube

factor actually reduces fuel cost for the single-stack furnace.

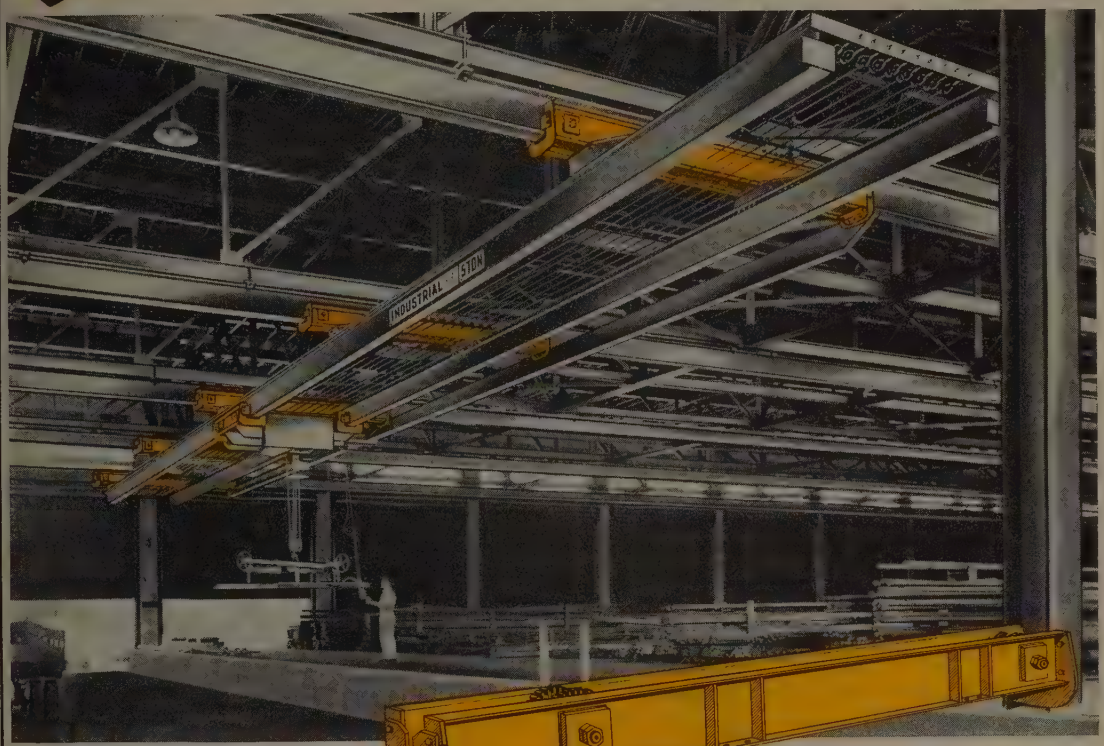
Another Consideration — With multiple-stack furnaces, annealers must govern the heat-up rate to suit the lightest stack of coils.

Rates for single stacks, on the other hand, can be set individually, and furnace times can be cut to the minimum. Same is true in the cooling cycles. In the case of the multiple-stack arrangement cooling time must be sufficiently long for the heaviest stack of coils to reach the temperature at which the cover can be removed, even though the smaller stacks had reached that point long before.

These facts, according to single stack users, account for their ability to get at least twice the tonnage from single-stack furnaces as is possible from multiple-stack units.

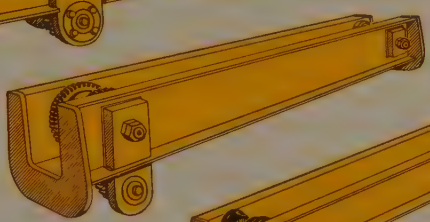
Industrial CRANES

feature Jig-Assembled, Jig-Bored All-Welded END TRUCKS

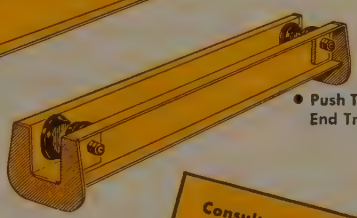


The above Photograph shows an Industrial multiple runway crane installed in a steel warehouse. The precision made End Trucks assure smooth performance of this huge 5-runway crane.

• Heavy Duty motor-driven End Truck.



• Hand Geared End Truck.



• Push Type End Truck.

All Industrial Underhung Cranes feature Jig-Assembled, Jig-Bored, All-Welded End Trucks. This construction guarantees accurate alignment of the cranes, even distribution of weight on the wheels and contributes much to the smooth, effortless performance of Industrial Cranes.

Industrial Cranes also feature (1) Forged Steel Wheels with Hardened Treads,* (2) patented Industrial Removable Head Axles, (3) Precision Ball and Roller Bearings, (4) Enclosed Bridge Drive Reducer operates in Oil Bath — for smoother performance and longer life in heavy duty service.

*Treads of Driving Wheels are Hardened.

Consult Industrial for Cranes to solve your materials handling problems.

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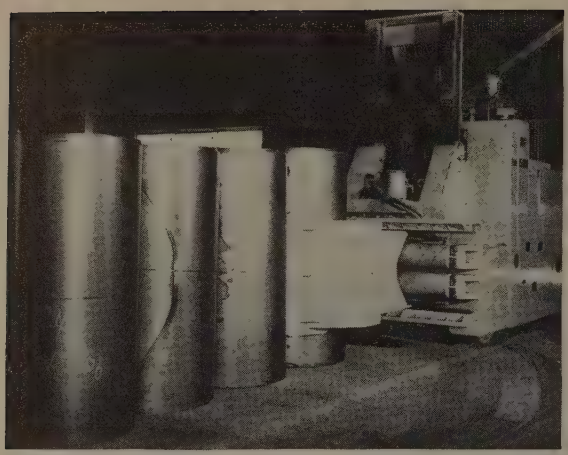
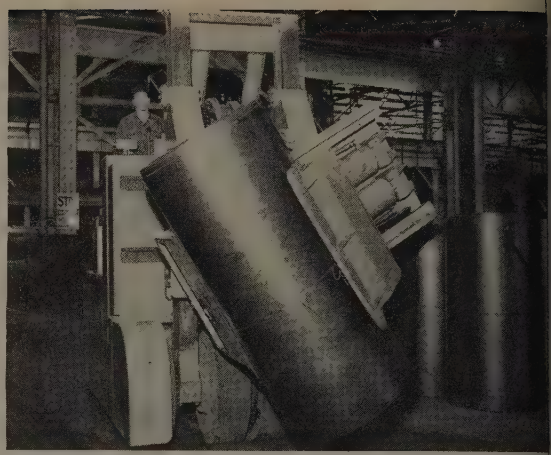
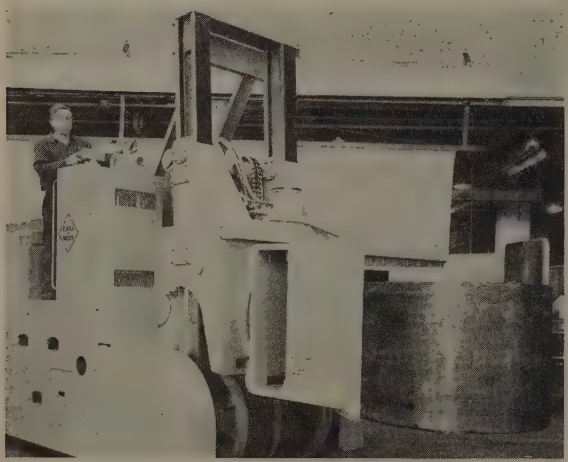


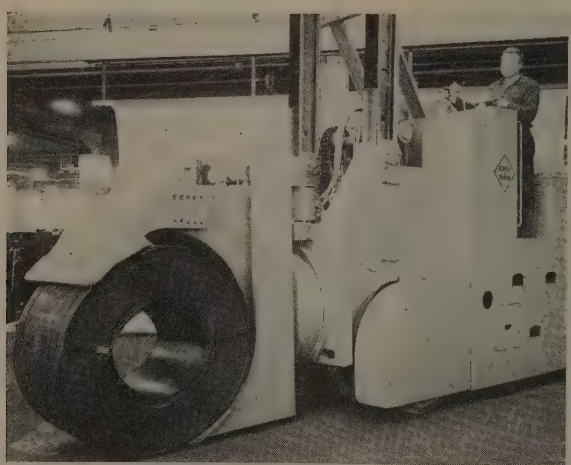
Coils are engaged in a vertical position by this special industrial truck equipped with rotating clamp attachment



As load is raised, clamp begins to revolve it. Major de sign problem: Proper clamp contour and pressure contr



Load is rotated to horizontal position while truck is in transit. Dual hydraulic pressure system with automatic pressure pick-up in clamp circuit prevents dropped rolls



A coil is disengaged in horizontal position. Present attachment picks up coils 56 inches in diameter, 15,000 pounds, and tiers to any height within truck's capacity

COIL HANDLING

Rotating Clamp Reaches All Position

Elwell - Parker's attachmen goes the rams one better i terms of positioning. It tiers i vertical or horizontal to an height within its capacity

PROBLEM of handling and positioning heavy coils o strip steel—one of the most cumbersome and costly— has yielded a major step to persistent developmen work. In a joint project, Elwell-Parker Electric Co. Cleveland, and U. S. Steel Corp. have come up wit an industrial truck equipped to load and positio 15,000-pound coils.

As is the case in many recent improvements i truck handling, the job is done by perfecting an at tachment with proper controls for manipulation While capacity of the initial model is rated at 15,00 pounds, equipment to handle heavier loads is no only possible but in the works.

Need for Positioner—Originally, overhead equip ment performed the coil handling operation in mos steel plants, as it still does in many of these jobs But when industrial truck manufacturers found i practical to build ram trucks capable of handlin coils that weigh as much as 80,000 pounds, they were often able to work significant economies and achiev considerable improvement in flexibility.

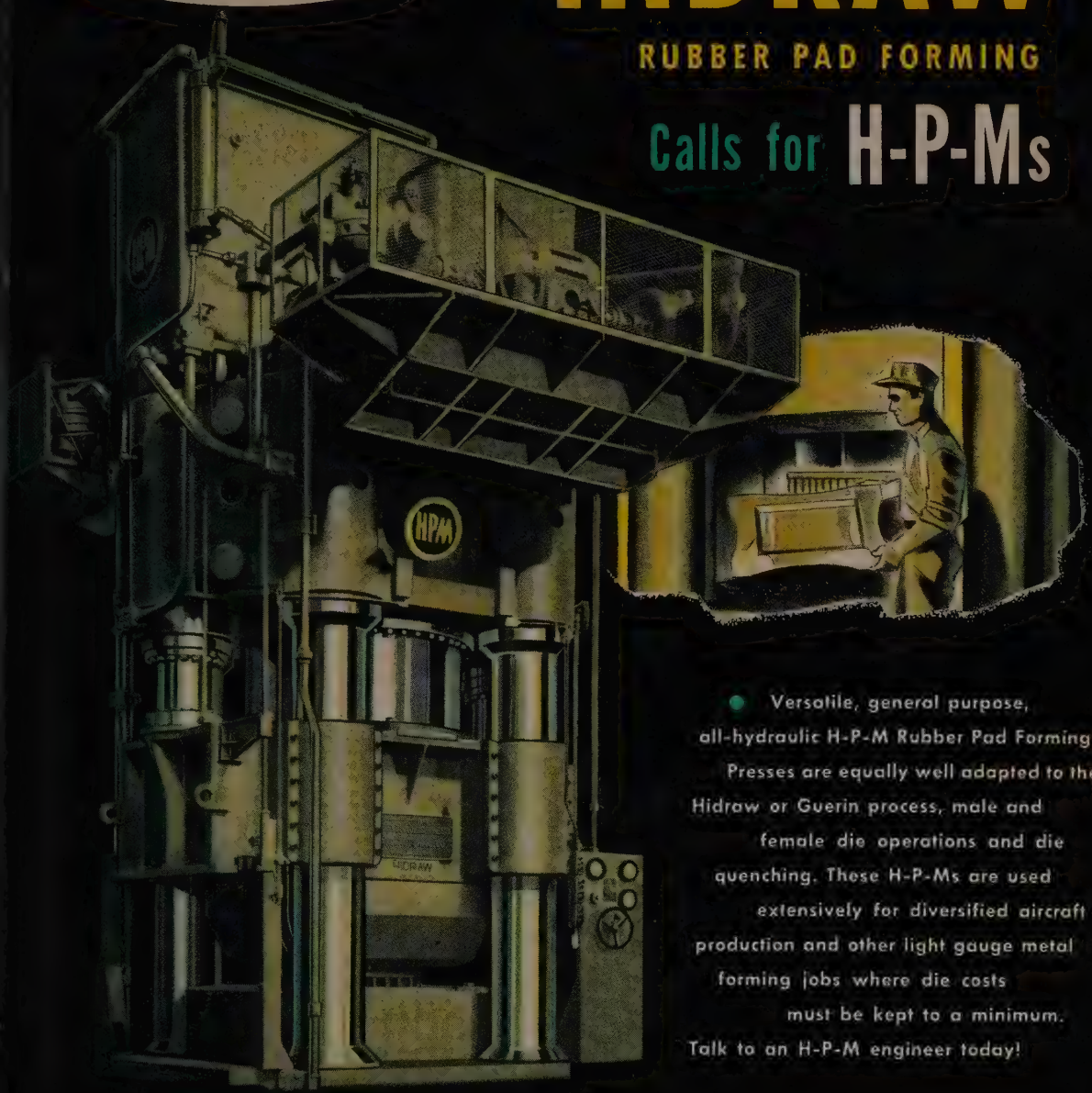
(Continued on p. 133)

H-P-M FASTRAVERSE
Rubber Pad Forming Presses

HIDRAW

RUBBER PAD FORMING

Calls for H-P-Ms



Versatile, general purpose, all-hydraulic H-P-M Rubber Pad Forming Presses are equally well adapted to the Hidraw or Guerin process, male and female die operations and die quenching. These H-P-Ms are used extensively for diversified aircraft production and other light gauge metal forming jobs where die costs must be kept to a minimum. Talk to an H-P-M engineer today!

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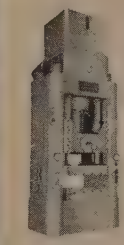
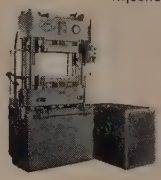
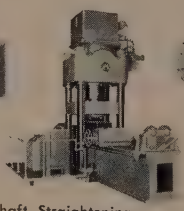

Metal Working

Blocking & Briquetting

Injection Molding

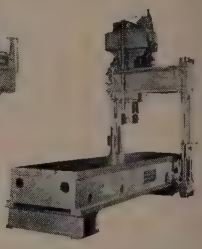

Compression & Transfer Molding

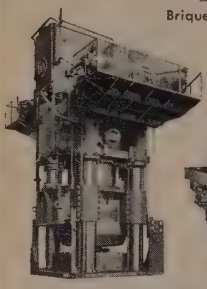

Shaft Straightening

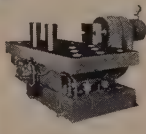
Die Casting

Rayon Steeping

Scrap Baling


Two-way Straightening


Rubber Pad Forming

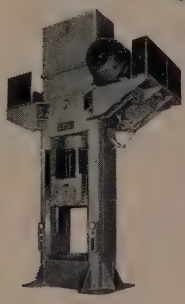

Bending

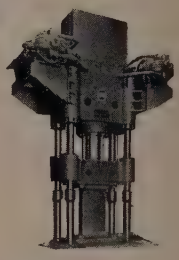
HPM-DIAFORM (Rubber Diaphragm Forming)

Reinforced Plastics Molding

Cartridge Case

Cold Extrusion


Shell Forging


Forging

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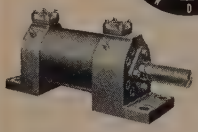

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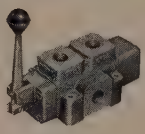

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L HANDLING . . .

ajor disadvantage was not size eight, but positioning. It was le to pick up a coil and set it n in the same position, but that the limit of movement possible.

otating Clamp — The rotating clamp built for U. S. Steel's y Sheet & Tin mill should do y with this limitation. The bat--powered truck is equipped with otating unit and hydraulic ip in place of conventional s or ram. It will pick up coils maximum 56 inches in diame- minimum 32 inches. A dual raulic pressure system with au- atic pressure pick-up in the np circuit prevents accidentally pping coils through pressure de- ase, taking care of the safety le.

Major problem in designing the np was to provide proper clamp a contour and pressure control hold the load and prevent inner turns from telescoping. At the ne time, it was necessary to id coil damage or surface mar- g.

Horizontal or Vertical—With the mp, an operator can pick up ls in horizontal or vertical posi- n and rotate them to opposite sition as required. Coils can be red in storage in either position any height within truck's ca- city.

y That Slide-Rule Down

Current trends in drafting prac- es will be evaluated in sessions an Engineering Institute held by iversity of Wisconsin March 10- . The institute, sponsored joint- by the UW extension division d the College of Engineering, is signed to aid persons engaged in afting, design and development. pic for the opening day dinner eeting is "Lay That Slide Rule own."

Scheduled topics and speakers r the three-day institute also in- ude: Drafting room standards; valuation of new and unusual afting aids; reproduction proc- ses and rehabilitation of existing awings; materials for drafting rposes; current trends in draft- g development; simplified draft- g practices; graphic methods at e drawing board; use of models y industry.

Edmont Case No. 329: Cleaning and acid-etching fabricated cab sections for cranes and shovels, prior to painting. A hazardous operation with ordinary unlined gloves because of the sharp metal edges. Edmont No. 922 gauntlets have been safely used for years. Their NEOX (reinforced neoprene) coating resists cutting and snagging as well as the acid; their soft flannel lining prevents skin irritations. For further economy, right and left hand gloves are individually replaced as they become worn out.

On big power shovels...

Preparing metal for paint is no problem, with job-fitted gloves

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To provide that kind of paint job on its famous "Lorain" cranes and shovels, The Thew Shovel Company pretreats its fabricated sections with acid, which insures a strong bond for the paint.

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World's largest maker of coated industrial gloves, available through all leading industrial suppliers.

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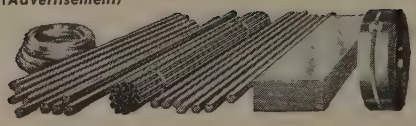

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

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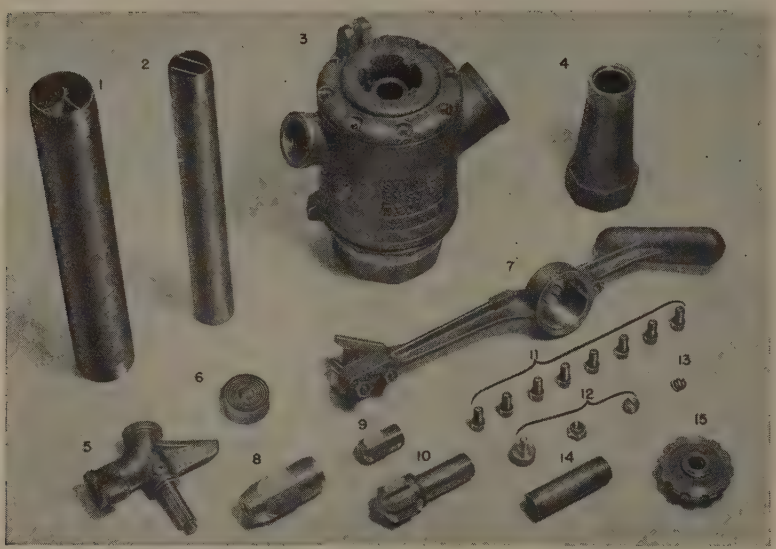


Component parts of 5-Star Sprinkler are made from brass, silicon bronze, and phosphor bronze for long, trouble-free service. Courtesy of The Skinner Irrigation Company, Troy, Ohio.

Rainmaking to Order...
A Job for Copper Alloys

The modern way to make fertile acres yield maximum crops is to supply the land with artificial rain—delivering it when and where it is needed and in the proper quantities.

But whether used to meet the vital requirements of field crops, or of lawns, athletic fields, golf courses, and orchards, the sprinklers, valves, couplers and other auxiliary equipment must operate efficiently and reliably under all conditions. They must be strong and tough to take heavy mechanical abuse and must be resistant to corrosive attacks from weather, soil, impurities, and water.

To stand up and deliver long, trouble-free performance in this rugged service, copper-base alloys are the preferred materials. They are universally used for water equipment which covers portable agricultural sprinklers, stationary and pop-up heads for concealed lawn irrigation, or self-closing valves and couplers in hoseless irrigation.

High-Pressure Sprinkler Uses Brass and Bronze

The agricultural sprinkler illustrated above is constructed with practically 100% brass and bronze construction. At 100 lbs. pressure it discharges 400 gallons per minute over an area equal to 2.8 acres.

The body of the sprinkler (3) is a brass casting, as are the main nozzle (4), driving nozzle body (5), impact arm (7), spring housing (15).

The upper bearing which positions the driving nozzle assembly is attached to the body by eight socket-head silicon bronze screws (11). A high-strength, fatigue-resisting alloy is essential at this point in order to bear the brunt of the swinging impact arm which turns the body. Excellent corrosion resistance is an important factor in its selection too, since the screws can easily be removed for periodic cleaning.

Brass for Nozzles and Screws

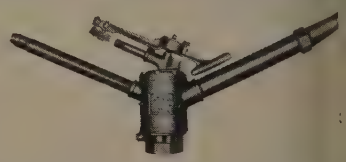
Water entering the body is discharged from three nozzles. The main nozzle arm is made of red brass pipe (1) to which is screwed a cast brass nozzle (4). This delivers an effective, finely broken stream to the outside area. The secondary nozzle arm also made of red brass pipe (2) and a leaded brass nozzle (8) covers the intermediate area. The third nozzle ar (14) is of red brass with a leaded br nozzle (9) and furnishes the stre which operates the impact arm m chanism, and provides moisture i mediately around the sprinkler. Insi nozzle arms (1) and (2) are br strip rectifiers which minimize turb lent flow of the water.

Nozzles (8 & 9) and slotted drivi nozzle body stem (10), as well as t regulating screw, special nut and s screw (12) are made from free-cutti Ledrite brass rod. Bridgeport's Ledr 6 has a machinability rating of 100 a gives excellent results in screw machi operations.

Phosphor Bronze Controls Rotatio

Motivated by a stream of wat pushing aside a reversible wedge, t sprinkler circles 360°, step by ste However, the key to the efficiency the stream coverage lies in the spe of rotation. In the center housing of t impact arm is a spring (6) of Pho phor Bronze Grade A (95% copp and 5% tin), which can be adjusted b increasing or decreasing the tensio thereby controlling the speed of rot tion of the sprinkler.

There is also a contact spring (1 which brakes the turning of the spri kler that is made of phosphor bronz



5-Star Sprinkler agricultural irrigation syste supply artificial rain in proper quantities wh and where it is needed. Courtesy of The Skinn Irrigation Company.

Let Bridgeport Help You

Manufacturers and designers shoul avail themselves of the Bridgepo laboratory service and the advice Bridgeport's sales metallurgists in r gard to selecting the proper alloy an temper for any specific purpose. Wid use of such alloys as silicon bronz phosphor bronze and Duronze III (sil con-aluminum bronze) can often in prove old products or should be co sidered when developing new item Please contact the nearest Bridgepo office for help on your metal require ments. (136

AUSES OF CORROSION

is article is one of a series of discussions by L. Bulow, corrosion metallurgist of the idgeport Brass Company.

PPER AND COPPER ALLOYS vs. ODIUM CHLORIDE SOLUTIONS (Cont.)

ow Potential Differences Between Copper-Base Alloys

The extremes in potential difference tween copper and various copper al- ys at any fixed concentration of so- um chloride usually are quite small, shown in the table. Consequently, pper and its alloys coupled to- ther can be successfully used in dium chloride solutions.

This explains why copper or a cop- r alloy brazed or welded with an- her copper alloy also gives good sults. Care should be taken in se- cting the brazing alloy which is herently resistant to dezincification sodium chloride solution (see pre- ious issues of this column).

Potentials of Copper, Copper Alloys and Steel in 3% Sodium Chloride Solution at 31°C. After 192-336 Hours Exposure

Alloys	Potential in Volts Saturated Calomel Scale
Steel (0.1C)	−0.762
Muntz Metal (60 Cu, 40 Zn)	−0.397
Aluminum Brass (76 Cu, 22 Zn, 2 Al, 0.03 As)	−0.325
Naval Brass (62 Cu, 37.3 Zn, 0.7 Sn)	−0.324
Arsenical Admiralty (71 Cu, 28 Zn, 1 Sn, 0.03 As)	−0.310
Deoxidized Copper (99.9 Cu, 0.03 P)	−0.291
Duronze IV (94.15 Cu, 5.5 Al, 0.25 As)	−0.289
70-30 Cupro Nickel (70 Cu, 29.5 Ni, 0.5 Fe)	−0.285
80-20 Cupro Nickel (80 Cu, 19.5 Ni, 0.5 Fe)	−0.281

The potentials given apply to the particular conditions under which the values were determined. Shorter or longer times of exposure may change these values.

The potentials and extent of corrosion in sodium chloride solutions are influenced by many factors such as:

1. Presence of corrosion inhibitors or accelerators.
2. Oxidation films.
3. Corrosion films.
4. Protective films of oil or barrier substances.
5. Temperature.
6. Concentration of sodium chloride.
7. Presence of other salts.
8. Gases — such as carbon dioxide, nitrogen, hydrogen, oxygen, chlorine, hydrogen sulfide, etc.
9. Velocity or agitation.
10. Type of Alloy.

Some of the above factors have been covered in previous issues of the corrosion columns. Others will be discussed in future issues.

Portable Hardness Tester for sheet metal is claimed to give readings within 2 points of Brinell scale with use of calibrated microscope and reticle, maker claims. Sheet stock from 0.010 to 0.250 in. thick can be tested with pressure applied to sheets by pair of parallel jaw pliers. Microscope has self-contained battery-type illuminator. **No. 1374**

Coiled Stock Cradle is said to have automatic trip bar which actuates a motor switch as slack trip is tightened to feed new loop of stock to production machine at 90 fpm. Motor automatically shuts off when correct loop size is reached. Feed rate is universal. Coils are rolled up ramp into cradle. Sizes are for 10, 13 and 15-in. roll widths and 36-in. diameters. **No. 1375**

Sheet, Wire Stiffness Tester is claimed to test both initial and basic stiffness with its eight test ranges. Test length, angle of deflection and rate of loading are standardized. Readings are taken directly from the dial, eliminating reference charts and tables, the manufacturer states. **No. 1376**

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Small Bench Press delivers pressure of 5 tons. It is said to be suitable for staking, riveting, forming, piercing, crimping, sealing, broaching, trimming, marking, and flanging. This air-oil bench press is connectable to 100-lb. shop air line. Press is equipped with automatic timer for cycle control and dwell time at bottom of stroke, which is adjustable from 0 to 3 in. If parts are not accurately placed in press die, unit will not function. **No. 1369**

Bending Tool is hand operated for ½ and ¾-in. copper tube. Double grooved head is attached to one handle. Second handle rotates on head center and carries the forming head. Degrees are marked at selected points on grooved head. **No. 1370**

Bar Stock Rack is designed so one operator with hoist can pick up and stack heavy bar stock, tubing and miscellaneous shapes neatly and safely, the manufacturer claims. Available in various capacities to fit needs. **No. 1371**

Rubber and Plastic Pouring Spout is designed, the maker reports, to prevent accidents from spilling, splashing or leakage when pouring liquids into small containers. Spout fits bottle openings from 1 to 1⅜ in. and has flow capacity of slightly more than 1 gallon per minute. Unit is made of acid-resistant rubber and plastic tubing. **No. 1372**

Adjustable Drill Jig for drilling holes through round and hex stock from ½ to 2 in. and cap screws from ¼ to 1¾ in., eliminates layout and cuts drilling time, manufacturer claims. Unit features hardened 60-degree V-blocks, adjustable stock for longitudinal location, and adjustable bushing carriers. Jig is suited for holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, etc. **No. 1373**

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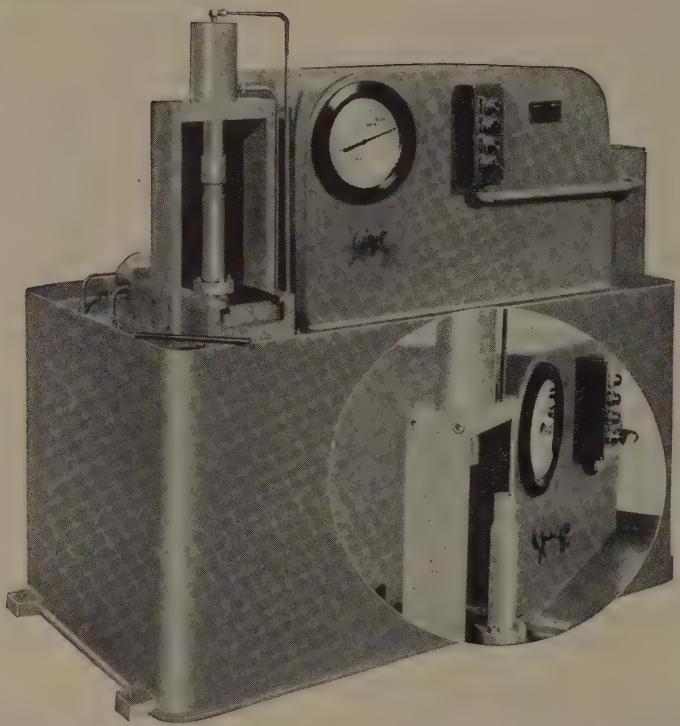

Hydrostatic testing of tubular, cylindrical or hollow shapes has been performed with Steel City equipment for many years. Leading manufacturers, plus Army and Navy Ordnance, have used these units for internal pressure tests on a mass production basis.

Steel City's service includes designing the machine to satisfy testing and production requirements, manufacturing the unit and installing in the customer's plant. Our varied experience includes a large variety of ammunition components, all tested to rigid Government standards.

Here is a typical hydrostatic testing machine for testing short lengths of tubing. Other typical applications are described and illustrated in a descriptive bulletin. If you have a hydrostatic testing problem, write for your copy or the name of our nearest Sales Representative.

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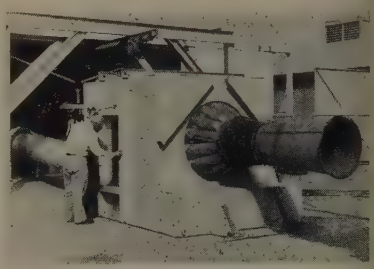
Airscoop Tester

ECONOMICAL method of testing aircraft engine inlet ducts which reduces the amount of wind tunnel testing required has been utilized by Chance Vought Aircraft Inc., Dallas, Texas.

The new test facility consists of a J-33 Allison jet engine, lent by the Navy, mounted in a 7-foot steel cube. The jet's exhaust nozzle is mounted outside the cube; the rest is incased in the building. From the opposite wall, a 30-foot steel



TESTING INLET DUCTS
. . . suction at adjective speeds

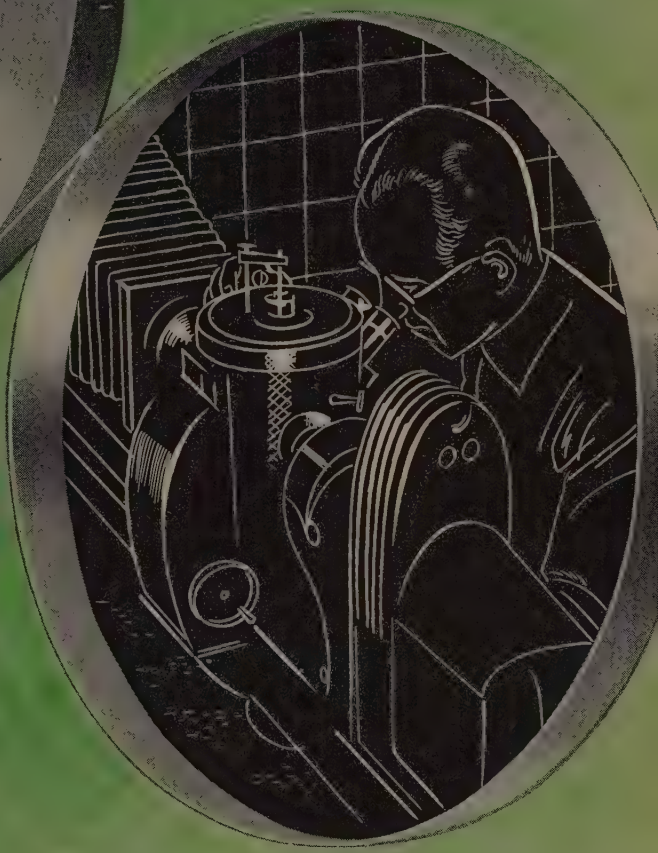
diffuser extends into a protecting shed where the airscoop to be tested is mounted, complete with manometers and other test measurement equipment. As the jet engine is turned up to high speeds it exhausts the air from its steel cubicle. The suction thus created results in air being sucked into the long tube through the plaster airscoop model at adjective speeds.

Portable and Quick—The whole test facility is both portable and economical. The jet engine is mounted in a standard wheeled dolly for easy transfer or maintenance work. Outside of the engine, the facility was made of material existing at CVS. It was developed as the need arose for greater capacity to check jet aircraft and guided missile airscoops without long technical delays and expense.

Machine Design Horizons

Proceedings of its 11th annual machine design conference are available in printed form, reports Cleveland Engineering Society. Eight abstracts and articles are presented in the 64-page publication, which looks to "New Horizons in Machine Design." Price is $2.

QUALITY



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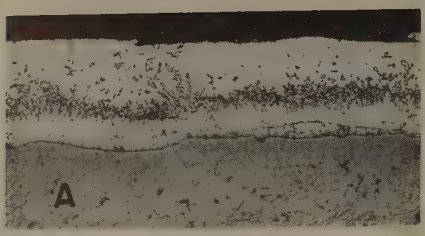
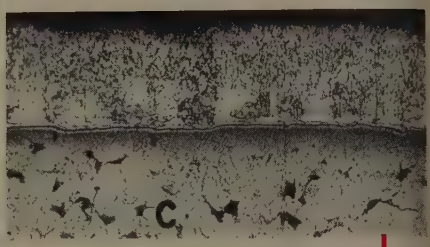
Weirton, West Virginia

NATIONAL STEEL CORPORATION

By K. S. FRAZIER
Chief Research Engineer
Detroit Steel Products Co.
Detroit





Analysis of steel shows up when it is galvanized. A is light. B compares dark and light. C is dark

Hot Dip Galvanizing

PART THREE

MATERIALS AND METHODS

Careful analysis is required here. For example, low-carbon, open-hearth steels are most suitable, but even they vary considerably. Coating may be too porous or too dark

STEEL CHARACTERISTICS AND APPEARANCE AFTER HOT DIP GALVANIZING AND PHOSPHATE ETCHING

	1	2	3	
Coating	Light	Dark	Light	Desirable
Base Metal	Ductile	Ductile	Brittle	
Carbon	0.07	0.08	0.04	0.05-0.13
Manganese	0.38	0.38	0.33	
Phosphorus	0.010	0.010	0.065	0.04 Max.
Sulphur	0.040	0.031	0.041	
Silicon	0.02	0.09	0.01	0.02 Max.
Chromium	0.02	0.02	None	
Copper	0.11	0.12		
Nickel	None	None	None	
Molybdenum	None	None	None	

TO PROTECT the advantages of controlled hot dip galvanizing, all phases of base materials and preparatory processes must be thoroughly investigated.

It is generally recognized that low-carbon, open-hearth steels are most suitable for hot dip galvanizing, but even they vary considerably.

Some show embrittlement of the base metal. Others produce a long, rapid growth of zinc-iron alloy crystals with excessive porosity; and, due to iron content, they darken rapidly at the surface.

It can be assumed that excessive nascent hydrogen intake of certain steels during sulphuric-acid pickling is partly responsible for these conditions. Constant release of hydrogen from the steel during galvanizing partly relieves embrittlement of base metal but creates unorthodox zinc-iron alloy growth.

Composition—Sample bars were selected for analysis as follows: Those with good ductility and a uniformly ductile coating, those showing rapidly darkening surface, and those showing embrittlement. The steel was analyzed and microsections photographed (above).

In general, open hearth bars (0.05 to 0.13 carbon, 0.040 phosphorus or less, and silicon of 0.02 or less) were the best. Bessemer steel showing higher phosphorus to 0.09 showed considerable brittleness after galvanizing, resulting in broken bars under normal stress.

Bars with high silicon content to 0.09 showed strong attack by the zinc and an abnormal zinc-iron alloy growth, with practically no free zinc acceptance on the surface. Due to the iron in the surface zinc and extreme porosity, this coating darkened rapidly with oxidation.

Fabrication — Many factors should be considered in the fabrication of materials for hot dip galvanizing. Cold upsetting or sharp bending tends to create internal stresses that become brittle in the galvanizing process. Annealing of this work after forming, hot bending or hot pressure upsetting eliminates these internal stresses and minimizes rejects.

Arc welding with coated rods leaves a flux residue surface difficult to clean and one that will not be adherent to zinc if not cleaned. Wire brushing after welding improves this condition. Light coated or bare wire in welding leaves a surface that zinc will adhere to.

Pressure butt welding of oily bars burns the oil from the weld but impregnates it into the steel close to the weld. Most caustic cleaning operations will not completely remove this oil and bare spots will occur in galvanizing. Cleaning with a vapor degreaser, such as trichlorethylene, removes it effectively. If thorough degreasing is done before welding, impregnation will not occur, and the lesser cleaning mediums are sufficient.

Appliqued materials covering surfaces before galvanizing must be closely attached and tight fitting to prevent the holding of pickling acids and moisture. With this condition the zinc in galvanizing will completely seal the edges of the joined pieces, and close fits will tend to eliminate warpage.

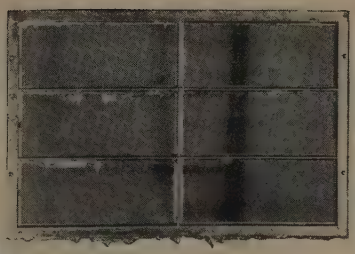


Fig. 2
Proper (left) and improper (above) ways to hang work. No bar should have slope of less than 30 degrees

Hanging Work—Hanging devices and manner of hanging work are important. In all cleaning baths, proper drainage of work tends to minimize contamination caused by liquid from one bath passing into the next. Correct drainage becomes imperative in the molten zinc bath, since uniform protection depends on proper zinc flow as the work is withdrawn.

With an open framework, no individual bar should have a slope of less than 30 degrees to the horizontal for proper flow. So if work is slowly and evenly withdrawn, flow of zinc takes place uniformly at the surface of the zinc, where the temperature remains uniform—about 60° F above the melting temperature of zinc. Surface becomes stable from air cooling closely above this line.

Work withdrawn quickly carries excess zinc well above the bath, allowing chilling during the flow. Coating runs and sags. Fig. 2 is an extreme comparison between correct and incorrect hanging.

Controlled Process — Vapor degreasing takes care of oil and grease. Temperature source and controls must keep vapor in plentiful supply at 190° F. Inadequate heat will make for poor cleaning, and excessive heat will waste cleaning materials and create unnecessary contamination of surrounding atmospheres.

In the pickling process for removing scale rust and oxides, many acids and combinations of acids are used. For economy and close control, sulphuric acid is most generally accepted.

With production work of a consistent nature, controls of temperature and time should be used for uniform work. Since this bath deteriorates by loss of acid concentration and pickup of iron, uniformity of pickling requires scheduled analysis and proper correction.

Heat, Concentration—Increase of temperature of bath and/or increased concentration of acid, within limits, counters the retarding action of increased iron content.

For example, as the iron content increases with usage from 4 per cent to 7 per cent, the acid concentration may be increased from 8 to 10 per cent. The temperature may be increased from 150 to 170° F or time of pickling may be increased. Beyond 7 per cent iron content, it becomes economical to dump the bath and replenish it with fresh liquid. Shortly before dumping, acid percentage may be allowed to run down to 4 per cent for economy in neutralizing with lime.

Much above 150° F the contamination of atmosphere from acid carried by released nascent hydrogen becomes a problem. Longer pickling time in a controlled system reduces the effectiveness of that system by idling other phases of the process.

Rinsing — As work is removed from the pickle solution, acid and iron salts remain on the surface and must be thoroughly removed. Hot water does a better job than cold and agitation assists materially. However, agitation holds this material in suspension and requires more water changes per hour.

At this point the base material is so thoroughly clean that short contact with the atmosphere will produce superficial red rust. To alleviate this, one or two cold water rinses will reduce the material temperature. Cold rinses also help remove remaining foreign matter.

Flux—To protect this clean surface until it reaches the galvanizing kettle, an immersion in a flux bath (usually zinc ammonium chloride) is provided for dry galvanizing. For wet galvanizing a flux foam blanket is built up directly on the molten zinc through which the work must pass.

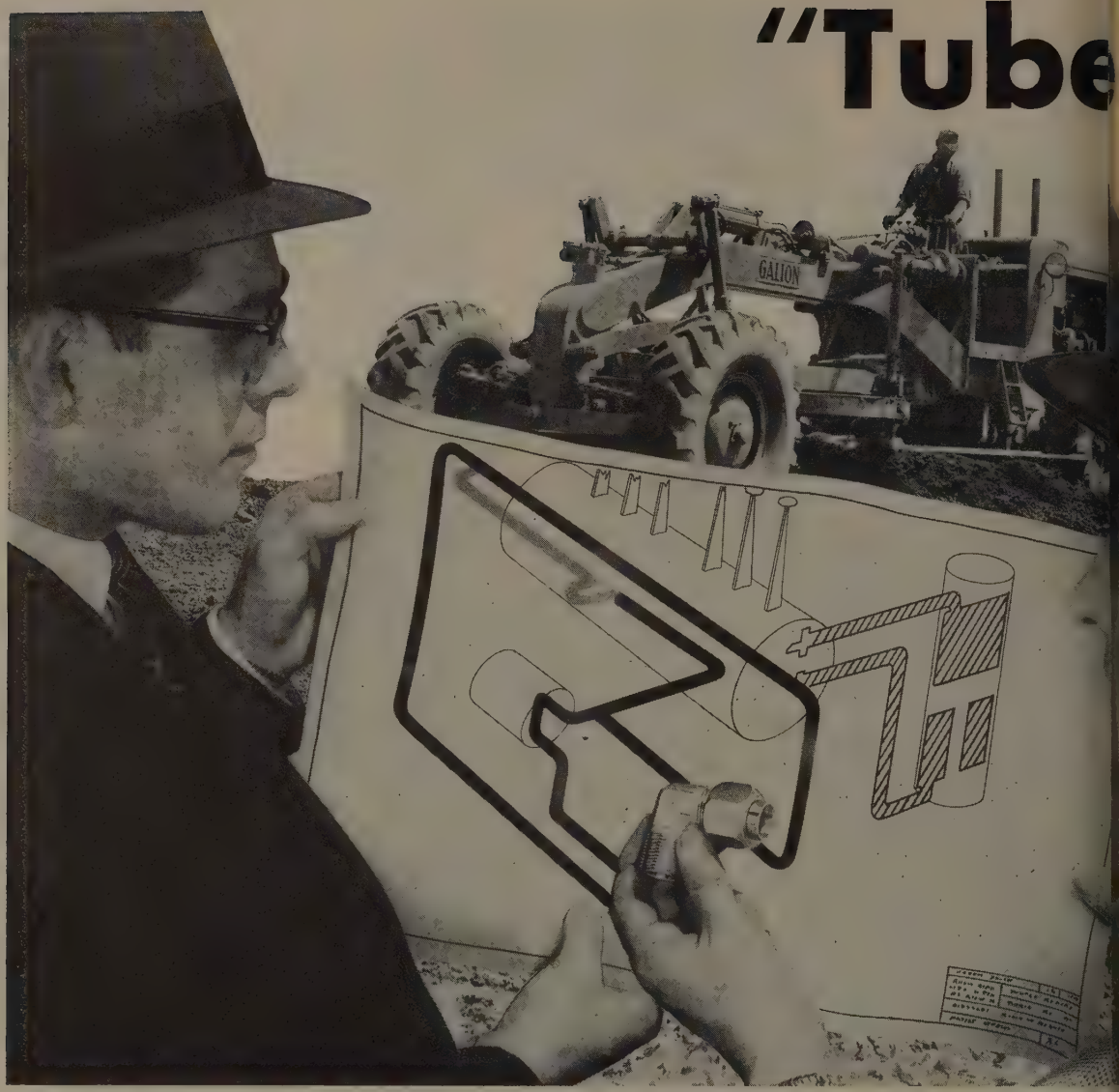
In the dry process, the temperature of the flux bath and its concentration are relatively critical to quality galvanizing, and here again, rigid controls prove valuable.

Drying — Moisture carried from this bath into the zinc would cause steam spitting or explosions. Drying is done in fast moving air at about 150° F. Air below this temperature loses its economy. Above 180° F it tends to deteriorate the flux coating. Contamination of this air from fuel gases must be avoided.

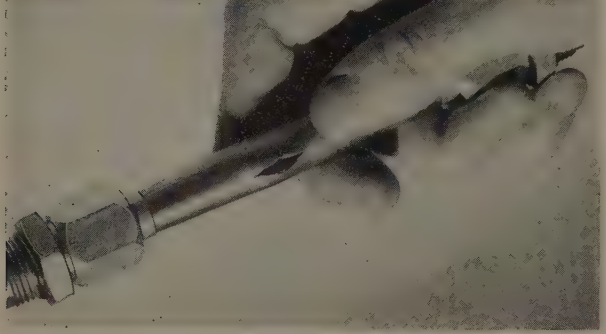
When dry, the work will show a thin, shiny, brownish coat of flux protection that will oxidize or volatilize as it contacts the zinc.

This is the last of three articles on the subject by Mr. Frazier. First and second discussed coating thickness and dross formation. Frazier serves on the Quality Control Committee of the American Hot Dip Galvanizers Association.

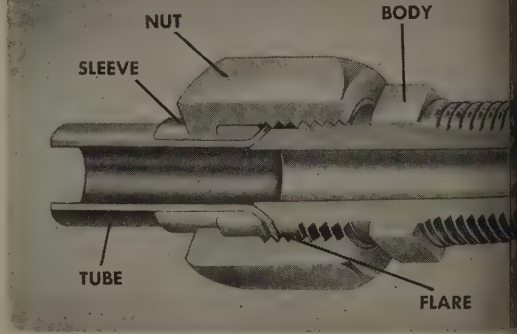
"Tube



Design engineers at the Galion Iron Works and Manufacturing Co. of Galion, Ohio, developed a simple, foolproof hydraulic control system for their line of motor graders. It offers a high degree of accuracy, safety, and dependability and has proved to be an outstanding success. One reason: Galion engineers specified Parker *Triple-lok* fittings for every grader they bui



At tube-bursting pressures Parker *Triple-lok* fittings remain intact with absolutely no leakage or distortion. They also hold leakproof over ranges of extremely hot and cold temperatures.



3-piece *Triple-lok* fittings are stocked by distributo in steel, stainless steel, brass and aluminum alloy. Th are also available in other materials on special ord

...up and forget it"

Use leakproof Parker *Triple-lok* fittings for trouble-free equipment

This motor grader, like most mobile equipment, takes severe punishment during its daily work. Jars and jolts; stresses and strains! Hydraulic control systems must be extra safe and dependable. That's why more and more manufacturers of lift trucks, agricultural and earth-moving machinery are specifying leakproof Parker *Triple-lok* fittings.

These flare fittings are absolutely leakproof even under the severest conditions of vibration, shock, and hot and cold temperatures. Thousands of destruction tests prove they will hold pressures that burst the tubing.

Using *Triple-lok* fittings is the easiest and best way to tube up your equipment. You get low assembly torque, easy disconnection, and repeated reassembly for trouble-free joints.

These fittings meet J.I.C. and S.A.E. standards plus specifications of the A.S.M.E. Code for Pressure Piping.

As a matter of fact, *Triple-lok* is the standard of industry. More *Triple-lok* fittings are used on industrial machinery than any other fitting.

So, tube up and forget it. Specify *Triple-lok* fittings for the equipment you build. Parker offers the widest range of shapes and sizes available . . . for tubing outside diameters from ⅛ through 2 inches. Mail the coupon for complete fitting data.

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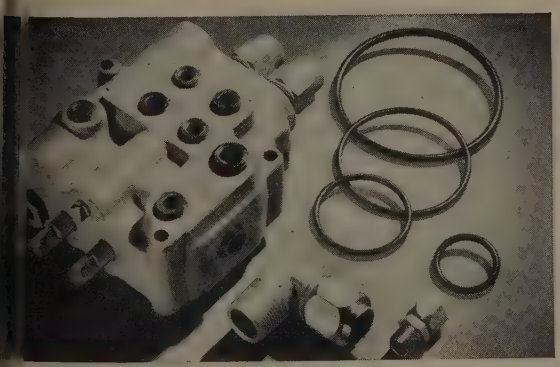

What other Parker products for hydraulic and fluid systems interest you? Ferulok flareless fittings? New hydraulic control valves? Synthetic rubber O-rings?

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Ends of combustion chamber are masked as Sicon heat resistant finish is applied. Midland Material Finishes Co. manufactures the product used by Solar Aircraft Co. on jet engine parts. Easy to apply, it protects surfaces subjected to heat at 800° F

Liquor Rehabilitates

Worn-out bituminous roads can be restored cheaply by using a waste product of paper mills, according to Prof. Lloyd F. Rader, University of Wisconsin.

Spent sulphite liquor is the product used. The method is new and much work remains to be done in the laboratory and on field projects, but the theory promises definite advantages economy-wise, reports the professor. Process of laying a bituminous concrete wearing course to resurface concrete pavements has been used extensively in Wisconsin. It's skid-resistant and affords good stopping power.

Thief-Proof Tags

A special electrode, developed by Eutectic Welding Alloys Corp., Flushing, N. Y., welds license tags in position and defies all efforts to pry them loose.

It's been reported that over 200 license tags per day are stolen from plates. Thus, a trip to the garage where they can weld them on might save some '54 tags. Very little weld metal is needed. The tag can be tack-welded in position or joined where the edges meet the license plate. The deposits are neat and corrosion resistant.

NEW PRODUCTS and equipment

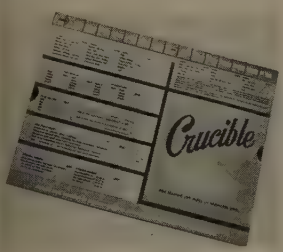
Reply card on page 149 will bring you more information on any new products and equipment in this issue

Stainless Selector

. . . will eliminate error

A new slide-rule-like chart quickly answers the question of exactly what type of stainless steel should be used for about 95 per cent of applications requiring the use of stainless. Selectors are designed especially for those who do not have metallurgical training.

The chart, designed by Crucible, grew out of their findings that



most stainless metalworking failures and losses result from wrong selection of stainless steels. The front of the chart contains a comparison of stainless physical and mechanical properties and elevated temperature properties. The reverse side gives a large number of the important characteristics of stainless. Crucible Steel Co. of America.

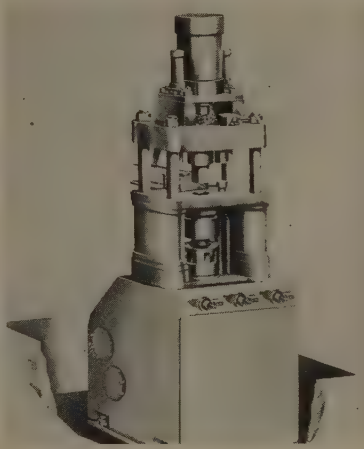
FOR MORE DATA CIRCLE NO. 1 ON REPLY CARD

Powdered Metal Press

. . . adjustable in operation

The model L, 50-ton compacting process offers high quality powdered metal parts at low cost. Designed for trouble-free operation, the moving mechanism is fully enclosed, pressure lubricated and sealed against dust.

It is a mechanical, four-column, crank-type press equipped with flywheel, pneumatic clutch and pneumatic brake and is driven by a 10-horsepower totally-enclosed motor through a variable speed drive. A special feature permits quick, accurate adjustment for changes in compacted-part density or weight



while the press is in operation. Visual indicators for top punch position, core float down-stop position, depth of fill and ejection stroke read directly to one one-thousandth of an inch. Baldwin-Lima-Hamilton Corp.

FOR MORE DATA CIRCLE NO. 2 ON REPLY CARD

Low-Temperature Chambers

. . . for cold-treating metals

Low-temperature chambers for cold-treating metals are offered by Tenney. Sub-Arctic chambers include models for producing temperatures to −170° F, the newer units being equipped with special rotary compressors designed for use with Freon refrigerants.

Available with 1, 4, 6, 9 and 12 cu ft work spaces, chambers are available in all five sizes to produce temperatures to −40, −80, −100, and −120° F. Typical metal-treating applications of low temperature cabinets are quick-aging,

stabilizing, stress equalization, shrink-fitting, hardening and superhardening of tool steels. Tenney Engineering Inc.

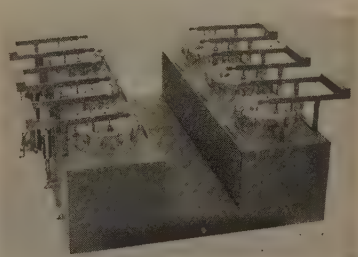
FOR MORE DATA CIRCLE NO. 3 ON REPLY CARD

Impregnating System

. . . features enclosed piping

Holmes Enterprises has designed a Poro-Pregnator developed for mass impregnation of electrical windings, for porous castings and other applications.

It features enclosed piping which provides for a cleaner plant working area. The piping may be



easily cleaned to prevent congealing of the solution during any unusual nonproductive period. It also lends itself to an extremely rapid and controlled flow of fluid.

Each Poro-Pregnator is engineered to meet specific plant re-

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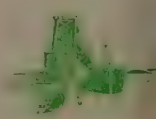

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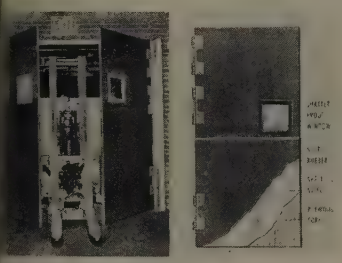
ements and can be provided from one to six autoclaves able by one person. Holmes erprises.

MORE DATA CIRCLE NO. 4 ON REPLY CARD

tory Access Doors

. . . have rubber hide

uilt to withstand splintering, nding, gouging abuse to which ory access doors are subjected fork lift trucks and other in- trial equipment, the new Ace aDor is rigid, strong, light- ght plywood reinforced with el and covered with a tough



le of soft rubber. It is practi- ly indestructible. The manu- turer says it will eliminate the ed for fancy bumpers or ex- nsive automatic door opening vices.

It closes tightly, with no high at losses or draft in cold ather. It resists corrosion, king it ideal for plating and kling rooms. American Hard bber Co.

MORE DATA CIRCLE NO. 5 ON REPLY CARD

ylon Belt

. . . with polishing diamonds

Die polishing problems posed by placement of conventional steels ultra-hard carbide in tube and d drawing dies are being solved commercial diamonds embedded belts of extruded Du Pont ny- n plastic.

Because of nylon's resistance to rrosion, almost any type of cool- t can be used during polishing erations. The belts are made five grades, varying from 100- esh sieve to 1-5 microns. Each ade is color-coded for easy ident- ication. Widths range from ⅛ ⅜ inch for standard 75-inch 104-inch continuous belts. E. I. uPont de Nemours & Co.

OR MORE DATA CIRCLE NO. 6 ON REPLY CARD

Metal Cleaner

. . . needs no heating coils

Klem K-A-T cleaner can be used at room temperature. It is a combination of a special alkaline and an efficacious emulsion cleaner and can be used for removing soil from ferrous and nonferrous metals.

The formula is adapted to use in hard water areas. Maximum corrosion resistance and minimum surface etching are claimed for the product and the protective film it imparts to workpiece makes painting possible immediately after rinse. It eliminates the need for heat coils in the tank. Klem Chemicals Inc.

FOR MORE DATA CIRCLE NO. 7 ON REPLY CARD

Mastic Nut Lock

. . . nuts won't loosen

A mastic nut lock, Zorlock, is said to provide tighter nuts, studs and screws and eliminates lock washers and special lock nuts.

It is easy to apply by means

THE "WHAT" Nearly forty steel mills, here and abroad, have purchased Differential Air Dump cars in capacities ranging from 30 to 60 cubic yards (level load).

THE "HOW" Massive air cylinders on both sides power the two-way, 50° dumping action. Wide spacing of fulcrums contributes to riding stability. No locking mechanism — no accidental dumping.

Down-folding doors chute the load a greater distance from track. Positive door return when car is righted. Overall ruggedness and simplicity of design mean minimum maintenance.

THE "WHY" It all adds up to a "higher ratio of payload to dead weight," superior performance — and ultimately to a prettier picture on the operating statement. That's "why" more and more steel mills have put Differential cars on their "earn-roll."

Other Differential Products: **Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Rotary Dumpers and other dumping devices, and Complete Haulage Systems.**

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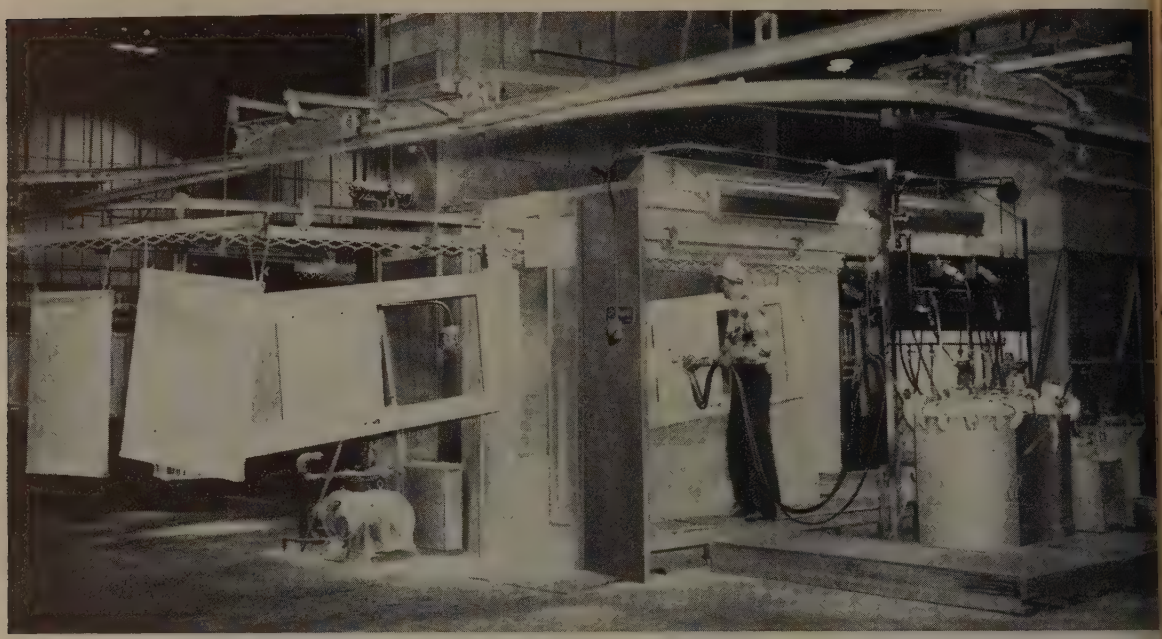

Panels, doors and fittings for Movable Interiors are given a prime coat of enamel in DeVilbiss Water-Wash Spray Booth — one of eight at The E. F. Hauserman Company.

Lifetime finish applied to movable walls with DeVilbiss equipment

The E. F. Hauserman Company uses eight DeVilbiss Spray Booths in its busy production line to paint movable wall panels, doors and fittings.

"We like DeVilbiss' versatility for our Movable Steel Interiors . . . it does a good job for us," says Don Clapp, general superintendent of The E. F. Hauserman Company, Cleveland, Ohio — the nation's oldest and largest manufacturer of movable partitions and wainscot.

One of the attractive, money-saving features of Hauserman Movable Interiors is that they'll stay new looking almost indefinitely *without repainting!* This feature alone saves thousands of dollars in maintenance costs for offices, schools, laboratories, hospitals and industrial plants that use Hauserman Movable Interiors. Hauserman uses DeVilbiss equipment extensively — Spray Guns, Spray Booths, Pressure-feed Tanks, Hose an Connections — to apply its exclu sive, lifetime surface finish to i products.

If you, too, would like to get th most from the spray method, g full data about DeVilbiss equip ment from your nearest DeVilbis jobber or branch office, today. C write us direct for free literatur

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Spraying saves one-fourth the time . . . up to 50% in overall painting costs. On many surfaces, like acoustical tile, it is the only practical method.

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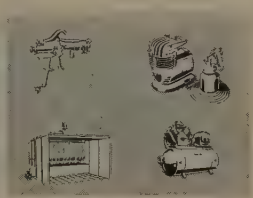

For fully coordinated spraying equipment: Spray guns, air compressors, spray booths, hose and all necessary accessories, DeVilbiss can serve you best.

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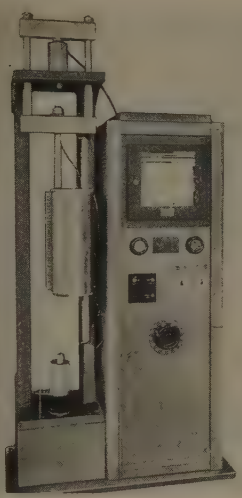
a spatula. It is applied to threads of the bolt before embly. Should the seal, or lock, broken, the lock prevents the from turning or vibrating off. is noncorrosive, nonoxidizing l prevents thread rust. Press- e Engineering Co.

MORE DATA CIRCLE NO. 8 ON REPLY CARD

eep Tester

. . has electric controls

An automatic, high temperature laxation creep testing machine of ,000-pound capacity incorporates SR-4 load cell as an electrical kup for load measurement. The machine offers advantage additional lower load ranges



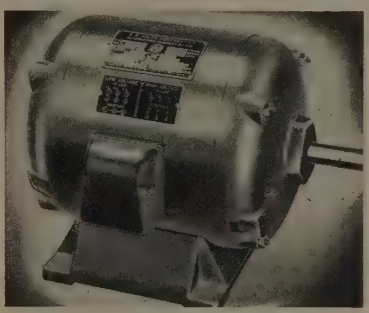
with a single pickup device. Accuracy claimed is within 1 per cent f reading or ¼ per cent of full cale, whichever is greater. The tandard recorder on the machine as a 10-inch wide strip chart vith 100 divisions for full-scale eadings of 10,000, 5000 and 2500 ounds. Baldwin-Lima-Hamilton Corp.

FOR MORE DATA CIRCLE NO. 9 ON REPLY CARD

ntegral Horsepower Motor Line

. . smooth change to new specs

Line of integral horsepower motors designed by A. O. Smith provides smooth, economical changeover to new standard prescribed by the National Electrical Manufacturers Association. At the same time they will offer users the new motors in either the present or in new mountings. This promises considerable saving to the customer because he will be able to avoid the cost of remodeling machines and he can liquidate inventories of



belts, pulleys and accessories without loss. Production will be in the one, one and one-half and two horsepower ratings. Contour lines and styling will be the same. The physical mounting dimensions will vary according to the customer's wishes. Electric Motor Division, A. O. Smith Corp.

FOR MORE DATA CIRCLE NO. 10 ON REPLY CARD

Floor Coating

. . . proof against skidding

An easily applied skid-proof surface coating for concrete, wood and metal floors has been developed by Penn-Salt.

NeoFloor is a grit-like material anchored in a matrix of resilient neoprene and bonded firmly to the floor with an adhesive primer. Both primer and coating are supplied in liquid form for easy, quick-drying application with brush or roller.

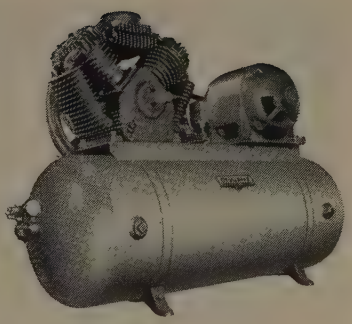
Being resistant to fumes, waterproof, it is especially useful in plants, shops, etc. where oils, greases and chemicals create safety hazards and maintenance problems. Pennsylvania Salt Mfg. Co.

FOR MORE DATA CIRCLE NO. 11 ON REPLY CARD

Precision Threading

. . . with six-chaser head

Precision threading of large diameter workpieces is possible with a six-chaser Lanco head, according to Landis. It's a revolving die head designed for application to the new No. 4 model C Landmaco threading machine and features a 2½-inch to 6-inch pipe capacity



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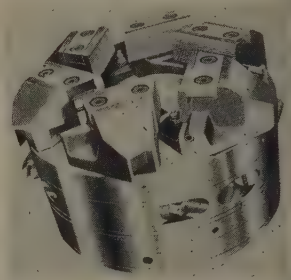
and a 2⅞-inch to 6⅝-inch bolt capacity.

The 6-inch Lanco is of massive



construction with all parts made of alloy steel. All operating parts are heat-treated after machining and then ground. This treatment assures both threading accuracy and excellent wearing qualities. Landis Machine Co.

FOR MORE DATA CIRCLE NO. 12 ON REPLY CARD

Carbide Hand File

. . . tackles abrasive problem

Hard abrasive materials pose no problem for the lightweight, streamlined carbide hand file introduced by Severance.

The file can be resharpened to as good as new many times, multiplying savings on each hand file operation. According to the manufacturer, they will work material that an ordinary steel hand file won't touch. Severance Tool Industries Inc.

FOR MORE DATA CIRCLE NO. 13 ON REPLY CARD

Dual-Head Rolling Machine

. . . speeds to 125 fpm

Dual-head rolling machine will handle material from 3-inch strips up to 36-inch wide sheets in a variety of gages, forming both sides or edges simultaneously. Identical or different rolls can be used on the two forming heads.

(Continued on p. 156)

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Yours FOR THE ASKING

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lling Mill Equipment

E. W. Bliss Co.—A 60-page re- ed and expanded brochure of ss rolling mill and accessory ipment contains a variety of in- llation photographs and de- iptive data on mill equipment the steel, brass and aluminum lustries. Included is a 16-page tion containing engineering bles and charts of value to en- neers in these metal-producing in- stries.

MORE DATA CIRCLE NO. 14 ON REPLY CARD

eed Drive

Louis Allis Co.—The Louis Allis ctronic Select-A-Spede is de- ribed thoroughly in bulletin No. 00. Advantages, its speed ranges d its applications are covered.

MORE DATA CIRCLE NO. 15 ON REPLY CARD

wer Transformer

Westinghouse Electric Corp.—A -page booklet relates develop- nts in construction, materials d operation of type SL power ansformers to benefits the user rives from standardization of e components. Standardized ocesses used during manufac- re, the methods of quality con- ol, shipping, determining and niting sound levels and preserv- g oil are discussed.

R MORE DATA CIRCLE NO. 16 ON REPLY CARD

resenting the A-C Line

Allis-Chalmers Mfg. Co.—A-C's mplete line of industrial equip- ent is pictorially described in the neral line catalog "Presenting ie Allis-Chalmers Line." 36 ages include illustrated informa- on and data on the HD-15 crawl- r tractor and the line of motor rapers and wagons, and pull- ype scrapers. 10 pages are de- oted to pictures and pertinent ata on selection of allied equip- ment and field-proved attachments engineered for use with A-C equip- ment.

FOR MORE DATA CIRCLE NO. 17 ON REPLY CARD

Visual Machine Loading

Remington Rand Inc.—A 6-page brochure describes in detail the Remington Rand Sched-U-Graph system of visual machine loading. The brochure contains valuable data on effective loading system and on the products that implement it. Benefits of system are discussed.

FOR MORE DATA CIRCLE NO. 18 ON REPLY CARD

Guide to Radiography

E. I. DuPont de Nemours & Co. —A guide for x-raying such metals as steel, magnesium and aluminum, with recommendations as to type of film and exposure for each is offered in a 28-page booklet available from the Photo Products Department. Exposure and processing data are given for each of the company's films used in industrial radiography.

FOR MORE DATA CIRCLE NO. 19 ON REPLY CARD

Container Handling Systems

Union Metal Mfg. Co.—The entire line of Union containers is described in a three-color, 4-page illustrated booklet. Two full pages show how the units are used to work-position, dump, store, collect and transfer a variety of materials and scrap. Steel skid platforms, pallets, shop boxes and Vu-O-Matic rotary storage stands for small parts are also covered.

FOR MORE DATA CIRCLE NO. 20 ON REPLY CARD

Pocket Saw Blade Guide

Victor Saw Works Inc.—28-page pocket-size guide is offered to users of metal-cutting saw blades. It offers helpful information on proper blade selection and use. Sections cover hand, power and band

3-8-54

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Penton Building, Cleveland 13, Ohio

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sawing with tips on selecting the right blade for the job, precautions to be taken by the operator and typical problems encountered in sawing metals.

FOR MORE DATA CIRCLE NO. 21 ON REPLY CARD

Wire Straightening

Mettler Machine Tool Inc.—A folder on their line of Shuster constant speed automatic wire straightening and cutting machines, ranging in capacity from 0.025 to ½-inch in diameter wire is announced by Mettler. 4-pages, illustrated.

FOR MORE DATA CIRCLE NO. 22 ON REPLY CARD

Production Shortcuts

New Jersey Zinc Co.—February issue of Metal Powder Press cites specific examples of production shortcuts made possible by utilizing nonferrous powder sinterings, as compared with parts produced by sand casting, extrusion or machining from bar stock.

FOR MORE DATA CIRCLE NO. 23 ON REPLY CARD

Muffle Furnaces

Surface Combustion Corp.—Atmotrol vertical type muffle furnaces are described in a bulletin offered by Surface Combustion. A detailed construction drawing depicts design features, and photographs show typical applications with types of parts being heat treated. Engineering data and charts on application of RX atmospheres to heat treat processing are included.

FOR MORE DATA CIRCLE NO. 24 ON REPLY CARD

Savings by System

Factory Service Co.—Methods for saving labor, space and equipment are outlined in a 28-page booklet. A variety of illustrated applications suggest the adaptability of Factory's Turner system to a host of space and handling problems.

FOR MORE DATA CIRCLE NO. 25 ON REPLY CARD

Carbide Die Specs

General Electric Co.—Latest information on standard cemented carbide die specifications and prices is offered by Carboloy Department. The publication lists round-hole dies, rough-cored and finished, braze-type rough-mandrel nibs, finished tube-drawing mandrels, square and hexagon shape dies, nail gripper and header die nibs, guide rings and wire guide bushings.

FOR MORE DATA CIRCLE NO. 26 ON REPLY CARD

Centralized Lubrication

Farval Corp. — An 8 - page brochure covers Farval centralized lubrication systems. How the system saves dollars, how it boosts production and how it solves tough lubrication problems are among the subjects discussed and illustrated.

FOR MORE DATA CIRCLE NO. 27 ON REPLY CARD

Dynamometer Systems

General Electric Co.—A two-color, 12-page publication tells how G-E's d-c dynamometer systems can be used for both motoring and absorption applications. Data is provided on the system's wide speed and torque range ability to meet a variety of testing and measuring needs.

FOR MORE DATA CIRCLE NO. 28 ON REPLY CARD

Platform Trucks

Fairbanks Co.—A reference catalog contains two-color photographs, structural details, specifications and complete information on over 50 models of two-wheel and platform trucks. An average load rating recommendation chart, showing best loading from 200 pounds to 4000 pounds for all types of trucks, is a feature.

FOR MORE DATA CIRCLE NO. 29 ON REPLY CARD

Rolling Mill Line

Farrel-Birmingham Co. Inc. — Just published is a 36-page bulletin describing and illustrating the Farrel rolling mills, gear drives, pinion stands and rolling mill handling equipment. Pictures of more than thirty sizes and types of mills for nonferrous rod, strip or sheet, metal foil and cold strip steel, plus illustration of related equipment, are all informatively captioned.

FOR MORE DATA CIRCLE NO. 30 ON REPLY CARD

Stretch-Forming Methods

Cyril Bath Co.—Metal Forming Division offers an informative pamphlet on stretch-forming methods. Number I of a series, the booklet describes how an upper roof cap framing member for motor truck trailers can be formed in a single operation. Illustrations show how the extended part in 63 S.O. aluminum is clamped in special

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ipper jaws, stretched and apped around a die fixed to a volving table.

R MORE DATA CIRCLE NO. 31 ON REPLY CARD

ck Turnover

Dexter Folder Co.—A two-color, page circular describes the Dex- r metal sheet pack turnover. The lder contains complete operat- g data, electrical specifications, ipping data and floor plan. Con- nsed data on the metal sheet eder are given.

R MORE DATA CIRCLE NO. 32 ON REPLY CARD

efractory Specialties

Mullite Refractories Co.—Data n development, physical proper- es and advantages of the Sham- a Mullite Refractories specialties re given in a new 16-page cat- log. A reference chart gives pecifications. Production and re- earch facilites of Mullite are cov- red.

OR MORE DATA CIRCLE NO. 33 ON REPLY CARD

Machinery Weldments

Air Reduction Sales Co.—"Ad- anced Automatic Flame Cutting or Machinery Weldments" relates ow one company converted from asting and riveted structures to veldments, and discusses problems nvolved in making the change.

OR MORE DATA CIRCLE NO. 34 ON REPLY CARD

Twist Drills

DoAll Co.—Brochure on twist drills covers taper shank, straight shank, three and four fluted drills, drill sets, drill blanks, counter- sinks, hardened sleeves, etc. Back cover gives helpful information on drill pointing and web thinning.

FOR MORE DATA CIRCLE NO. 35 ON REPLY CARD

Laboratory Planning

Scientific Apparatus Makers As- sociation—Laboratory Equipment Section announces a revised edi- tion of "Better Laboratory Plan- ning." A section is devoted to recommended bidding practices for building planners. 25-pages, illus- trated.

FOR MORE DATA CIRCLE NO. 36 ON REPLY CARD

Turret Mills

Rogers Machine Works Inc. — Rogers offers a 6-page catalog ful- ly illustrating and describing the Perfect 36 vertical turret mills. Illustrations show various opera- tions such as boring, drilling, turn-

for a fabulous finish...

Jewel Brand

ABRASIVE BELTS

in all grits and widths for grinding, sanding, polishing metal, wood, leather, plastics, rubber.

ABRASIVE PRODUCTS, INC.
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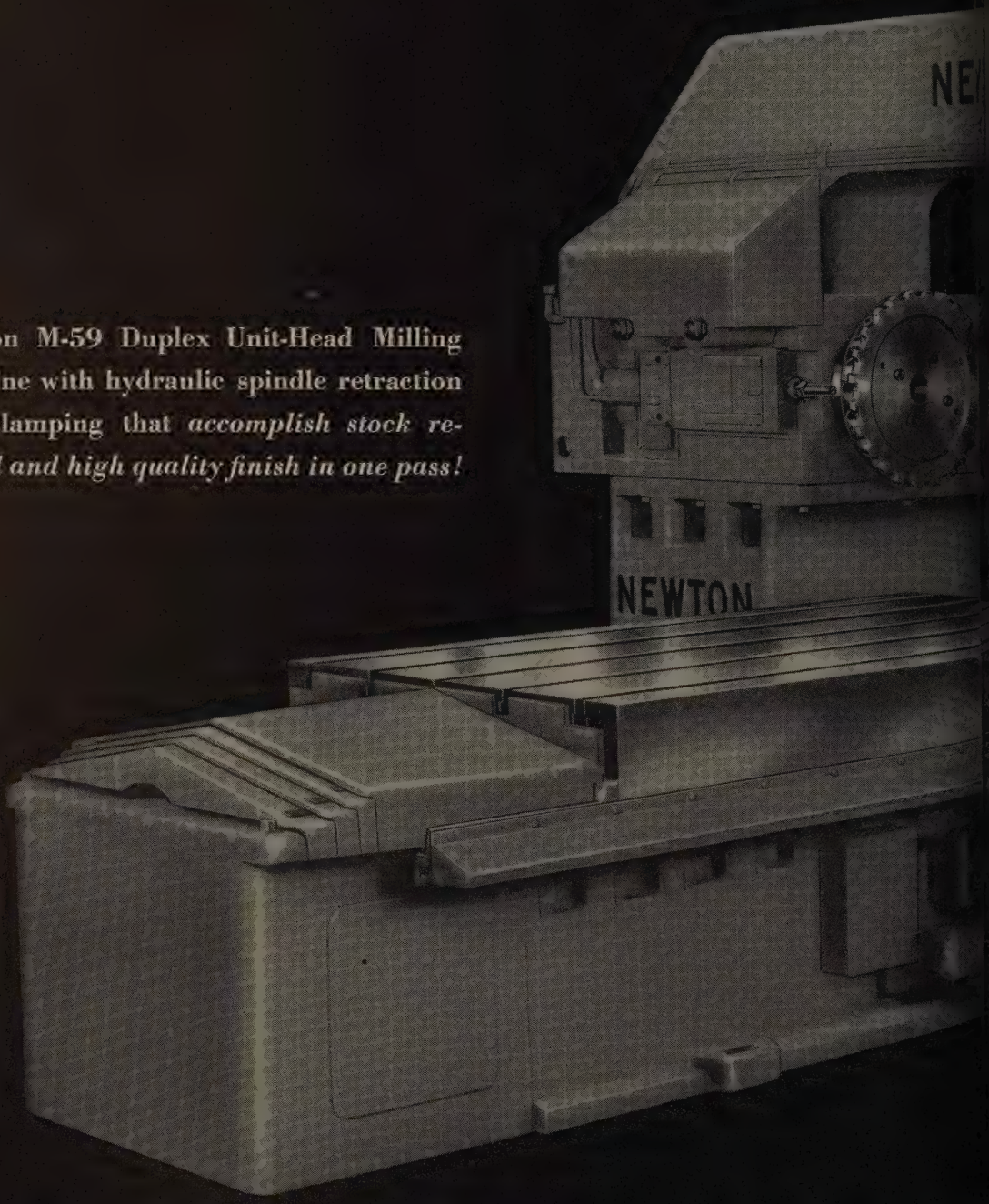
. . . as good

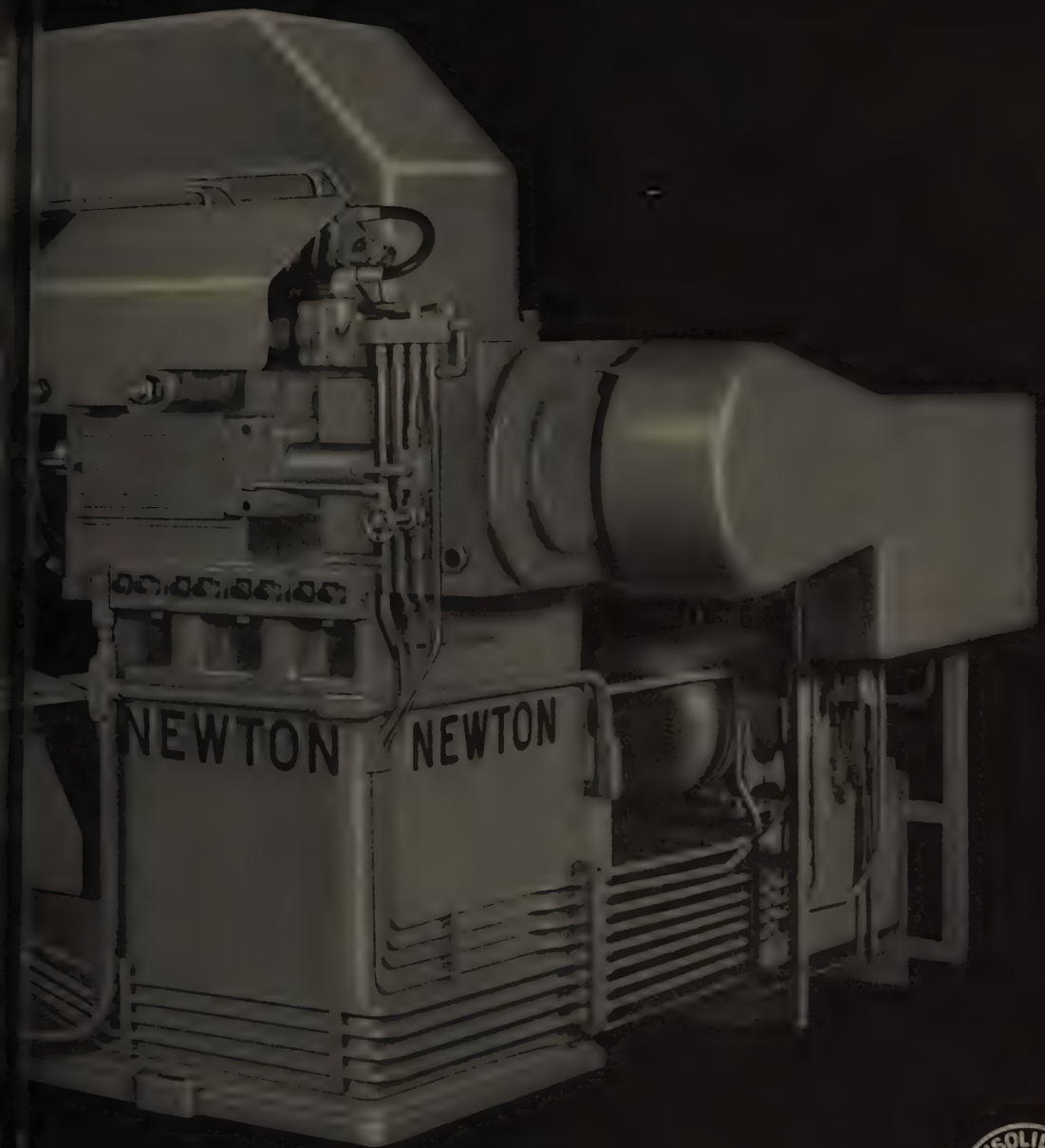


Newton M-59 Duplex Unit-Head Milling Machine with hydraulic spindle retraction and clamping that *accomplish stock removal and high quality finish in one pass!*

CONSOLIDATED MACHINE TOO

Wholly owned subsidiary of Farr

us it looks!



CONSOLIDATED MACHINE TOOLS

ORPORATION, ROCHESTER, N. Y.

rmingham Company, Incorporated

an ACCO product

ACCO Registered* WIRE ROPE SLINGS

A STANDARD OF QUALITY

●"ACCO *Registered*" is the registered trademark applied by American Chain and Cable Company to slings of the highest grade, but it is more than just a trademark.

"ACCO *Registered*" is a definite specification of quality in both material and design.

To be "ACCO *Registered*," a wire rope sling must meet the following specifications:

1. **It must be made from high strength "Green Strand" wire rope.**
2. **All parts of the finished sling must have a breaking strength equal to the catalog strength of the sling body.**
3. **All fittings and attachments must withstand a proof-test equal to at least two times the rated capacity without permanent distortion.**
4. **Actual field service tests of each design.**

As evidence of compliance with these requirements each sling is given a metal identification tag and is accompanied by a Certificate of Proof Test and Registry.

What does ACCO REGISTRY mean to you?

It means that you can equip your shop with "lifting tools" and be confident that their designs and materials are specifically selected for the highest efficiency by trained engineers who spend all their time on slings.

It means that you can be sure that your men, materials, and machines are given the highest protection against injury during lifting operations.

Where can you get ACCO REGISTERED SLINGS?

To make ACCO *Registered* Slings immediately available for your requirements, American Chain and Cable Company, Inc. has appointed one of the best industrial supply houses in your community as an ACCO *Registered* Sling distributor. Selection for such appointment is made on the basis of the distributor's desire to serve you, his grasp of your problems, and his willingness to maintain in his stock sizes and types of slings you need.

See your ACCO *Registered* Distributor or write to us for literature and his name.

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ACCO TRADE MARK

Wire Rope Sling Department
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

plus Links Shackles Hooks

ing and threading performed on this mill, as well as complete specifications.

FOR MORE DATA CIRCLE NO. 37 ON REPLY CARD

Production Control

Reeves Pulley Co.—Bulletin G-537 covers such subjects as "Why Automatic Control?" and tells how Reeves can solve your problems in any of five basic processes. Two variable-speed units plus eight automatic controls are covered completely. Illustrated.

FOR MORE DATA CIRCLE NO. 38 ON REPLY CARD

Reduced Core Box Wear

Federal Foundry Supply Co.—An 8-page bulletin describes Federal's attachment for its line of core blowers, designed to hold core box wear to a minimum. A how-to-operate-it section is included. Fully illustrated and diagrammed.

FOR MORE DATA CIRCLE NO. 39 ON REPLY CARD

Grinding Attachment

Detroit Reamer & Tool Co.—An 11-page brochure covers the model 500 circularity grinding attachment. A complete description of the device, and its advantages, is supplemented by illustrations and diagrams.

FOR MORE DATA CIRCLE NO. 40 ON REPLY CARD

Lathe Job Facts

Potter & Johnston Co.—A 4-page brochure is released covering the model 4-U automatic turret lathe. Its features, specifications and job facts are listed. Back page gives a brief description of the complete line of P&J automatic turret lathes.

FOR MORE DATA CIRCLE NO. 41 ON REPLY CARD

Brakes and Clutches

Warner Electric Brake & Clutch Co.—Small electric brakes and clutches recently developed by Warner are described in this booklet. 6-pages, illustrated, cover advantages and specifications.

FOR MORE DATA CIRCLE NO. 42 ON REPLY CARD

Vibration Data

International Research & Development Corp.—15-pages show how International can help solve your vibration problem. IRD's vibration analysis equipment helps detect, analyze and correct these problems. Illustrated.

FOR MORE DATA CIRCLE NO. 50 ON REPLY CARD

Colorado Fuel and Iron open hearth being resurfaced with Permanente 165 Ramming Mix. It's one of the many refractory materials we regularly supply to C F & I.

INCREASE YOUR OPEN HEARTH PRODUCTION

WITH PERMANENTE 165 RAMMING MIX!

THE UNBEATABLE combination of Permanente Ramming Mixes and Permanente Basic Bricks provides *superior* open hearth performance for many of the country's leading steel mills.

This combination results in lower cost per heat . . . gives a better bottom with added protection from tap hole to pan. This makes it possible for furnaces to break production records, with extra tonnage every hour.

Permanente Ramming Mixes combined with Permanente Basic Bricks can boost *your* open hearth production well above current rates.

Send for booklet giving *all* the important advantages of (1) Permanente 165, (2) the companion material, Permanente 84 and (3) Permanente Refractory Brick. Upon request, your Kaiser refractory engineer will promptly offer you research, design and installation service to help you obtain more steel tonnage per year, at lower bottom cost per ton. Call or write principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.

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Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

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adds a magic touch

Hendrick Ornametal

TRADE MARK

More and more metal fabricators are realizing the sales benefits that stem from using Hendrick Ornametal in their product design. Whether you require perforated metal for radiator enclosures, stove panels, kitchen cabinets, clothes and broom closets, lockers or similar applications, you can be certain there's a Hendrick Ornametal design suited for your exact needs.

Lightweight and supplied in special bright finish, Hendrick Ornametal is made of cold rolled steel suitable for painting or plating. For more complete details, contact Hendrick direct.

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High Temperature PORCELAINS

for every Industrial Purpose

Precision-made McDanel flasks, crucibles and other standard and special laboratory items are outstanding in quality and performance. McDanel High Temperature Specialties undergo the most exacting inspections and checking at each stage of design and manufacture. They are trust-worthy. They have proved themselves by their record of more than 30 years' service in the nation's leading metallurgical laboratories.

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COMBUSTION TUBES

McDanel High Temperature Porcelain Combustion Tubes and Zirco Tubes are non-spalling, non-blistering and gas-tight. They keep control costs at minimum through their long, long life.

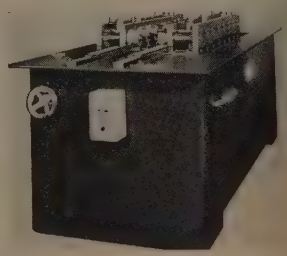
McDANEL REFRACTORY PORCELAIN CO.
BEAVER FALLS, PENNA.

NEW PRODUCTS and equipment

(Continued from p. 148)

Material comes out perfectly parallel, regardless of camber or deviation in shearing.

Easy-to-work mechanism moves forming heads apart. Feed gages



do not have to be reset as they move with forming head. Speeds up to 125 fpm are attainable. Torrington needle bearings are used, table reinforced underneath, and all controls are within easy reach. Flagler Corp.

FOR MORE DATA CIRCLE NO. 43 ON REPLY CARD

Strapping Tape

. . . has high tensile strength

Brainard Steel Division reports a service which simplifies industry's packaging and materials-handling operations. The company's strapping system has been expanded

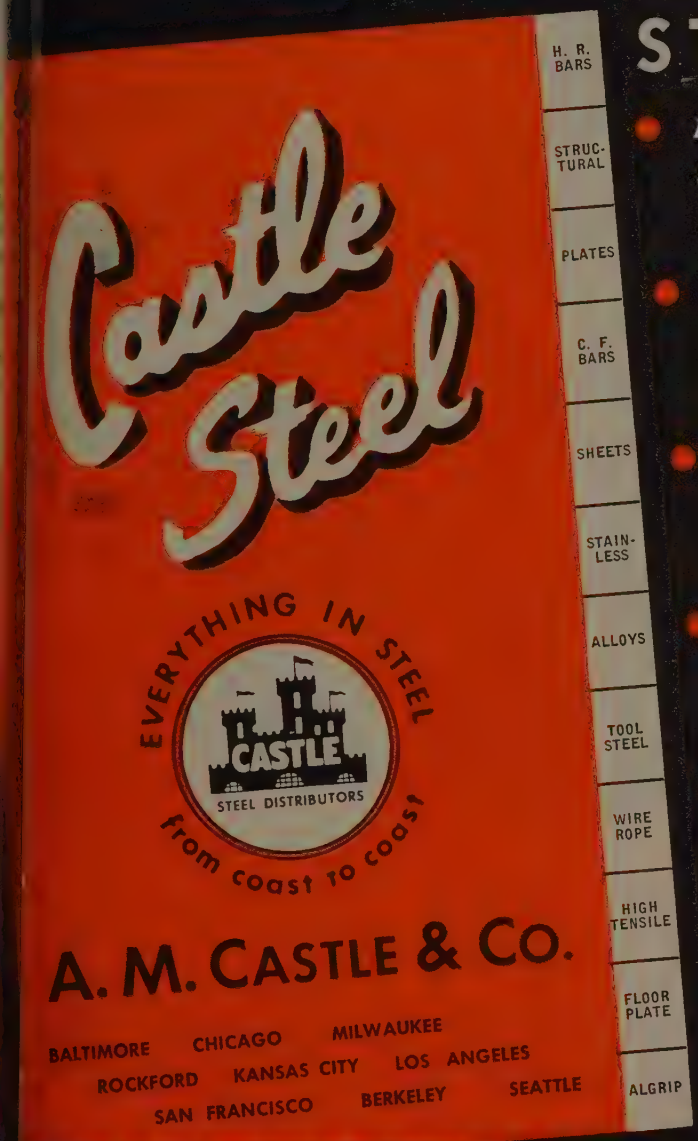
to include a complete line of strapping tapes, both pressure-sensitive and gummed, as well as dispensers for all applications.

The tape is filament-reinforced to provide high tensile strength and is designed specifically for strapping application. Brainard Steel Division, Sharon Steel Corp.

FOR MORE DATA CIRCLE NO. 44 ON REPLY CARD

If you order steel... you need the new

A. M. CASTLE & Co. STOCK BOOK



- *LISTS ONE OF THE LARGEST STOCKS* of all kinds of steel in the United States--ready for quick delivery.
- *INVALUABLE FOR ESTIMATING* your regular and special steel requirement costs--accurately.
- *CONTAINS LATEST TECHNICAL* data on new steels--leaded steels, leaded alloys, etc.
- *INCORPORATES TIME-SAVING* reference information on selecting the right steel.
- *INCLUDES SPECIAL CHARTS* to compute physical properties, machinability.

If you order steel–it will certainly pay you in more ways than one to have a copy of the new A. M. Castle & Co. Stock Book. And, it is yours for the asking. But the supply is limited, so mail the coupon–TODAY. No obligation.

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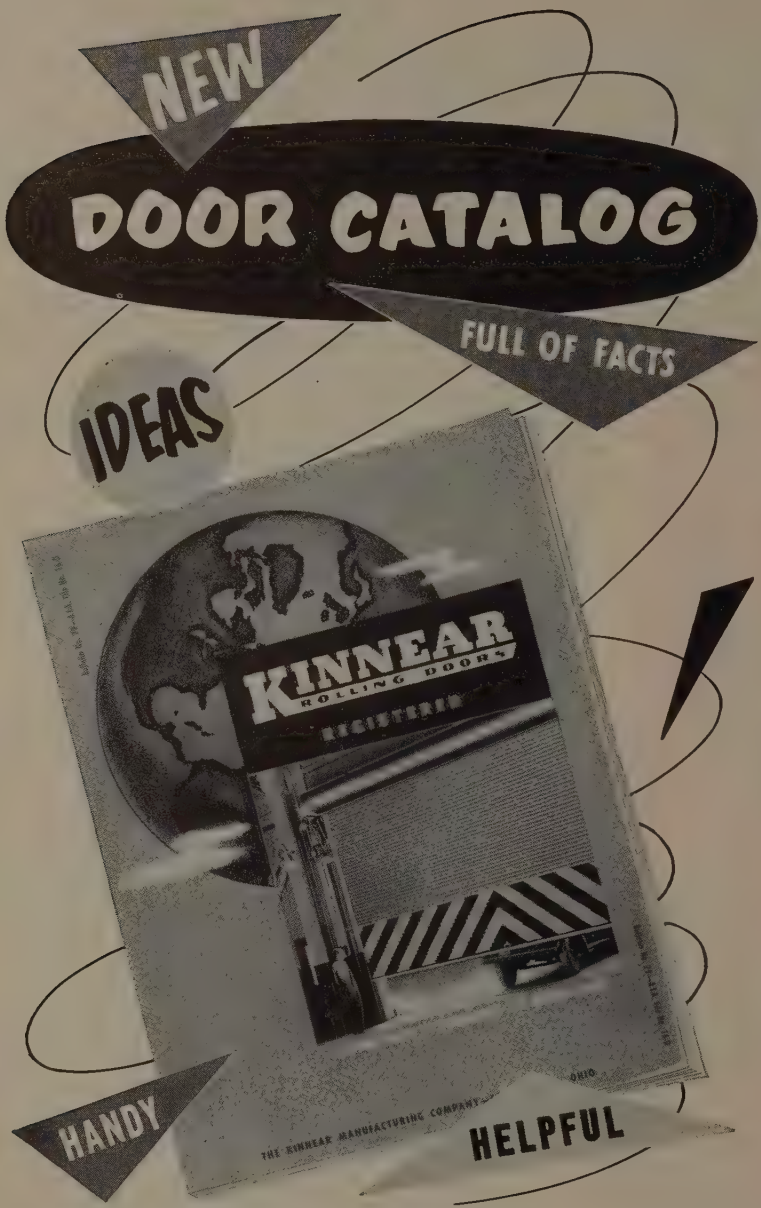


You'll have full information on cost-cutting doors for every need in this new 1954 Kinnear catalog.

It gives you full, up-to-the-minute information on how to save maximum space, cut costs, boost efficiency and get more protection at doorways in old or new buildings. In addition to complete data on Kinnear Steel Rolling Doors—the doors with the famous, *Kinnear-originated* curtain of interlocking steel slats—it tells all about Kinnear Steel Rolling Fire Doors, sectional-type Kinnear RōL-TOP Doors, and the protective Kinnear Steel Rolling Grilles. Write for your FREE copy TODAY!

SAVING WAYS IN DOORWAYS

KINNEAR ROLLING DOORS

The **KINNEAR** Manufacturing Company

FACTORIES: 1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.

Offices and Agents in Principal Cities

NEW PRODUCTS and equipment

Rectifier-Type Welder

. . . stepless current control

A 400-amp, three-phase, direct-current rectifier-type welder with a 60 per cent duty cycle can be equipped to operate on two-phase power and has a current welding range of 70 to 500 amp. The G-E type WR40A can be utilized with a variety of electrode sizes for repair, maintenance and construction work.

The selenium rectifier welder makes current adjustments easy

by means of stepless current control. Instant welding is assured. Few moving parts to wear out make maintenance easy and inexpensive. It is available with full-time arc force control which minimizes pop-outs and freezing-in. General Electric Co.

FOR MORE DATA CIRCLE NO. 45 ON REPLY CARD

Plastic Mold Flow Control

. . . faster, more even flow

A new formulation of general purpose Styron (Dow Polystyrene) is expected by Dow Chemical to open new markets for polystyrene by providing molders with better control over the flow of plastic in the mold.

Styron 688, flows faster and more evenly throughout the mold. It may be used advantageously in such applications as thin wall containers, vials and tubes, wall tile, back painted parts, large boxes and containers, egg crate and honeycomb sections, or brush backs. Testing shows that in

The new Life-Line A motor

...the big step ahead by Westinghouse

Here it is . . . the new Life-Line® "A" motor. A new motor that steps ahead to lead the industry. A new motor that reflects the continuing engineering and manufacturing leadership of Westinghouse. A new motor that gives you . . .

Greater protection	Lower maintenance costs
Greater application flexibility	Fewer motor outages
Smoother, quieter operation	Longer motor life

The new Life-Line "A" motor is still a step ahead of the industry. How? Through balanced design and proved performance. Look at the improved materials and advanced mechanical and electrical components—each one matched to its neighbor.

YOU CAN BE SURE...IF IT'S

Westinghouse

NEW DOOR CATALOG

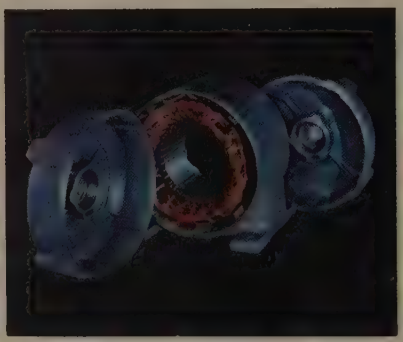
NEW PRODUCTS and equipment

Rectifier-Type Welder

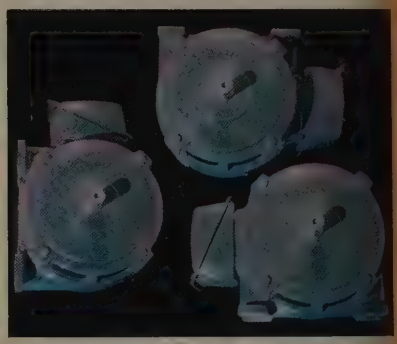
. . . stepless current control

A 400-amp, three-phase, direct-current rectifier-type welder with a 60 per cent duty cycle can be equipped to operate on two-phase power and has a current welding [illegible] to 500 amp. The G-E [illegible] be utilized with [illegible] de sizes for re- [illegible] construction [illegible] lder easy

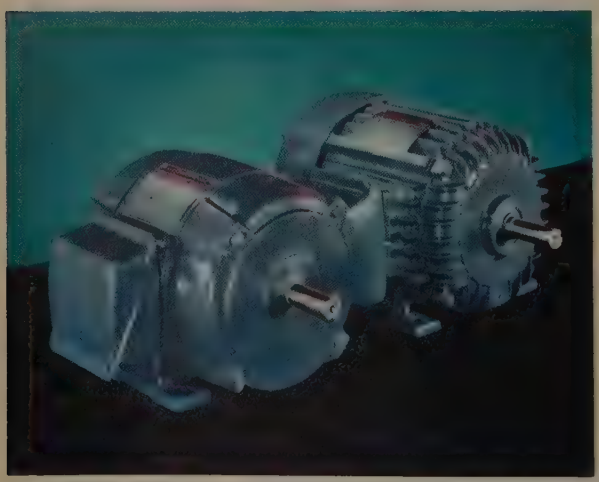
New 4-WAY SEAL, pre-lubricated bearing . . . another step ahead. A bearing with *two* protective seals on *each side.* Inner seals form labyrinth joints. Outer seals act as flingers. This bearing has the advantages of the original Life-Line sealed bearing—*plus extra protection.*



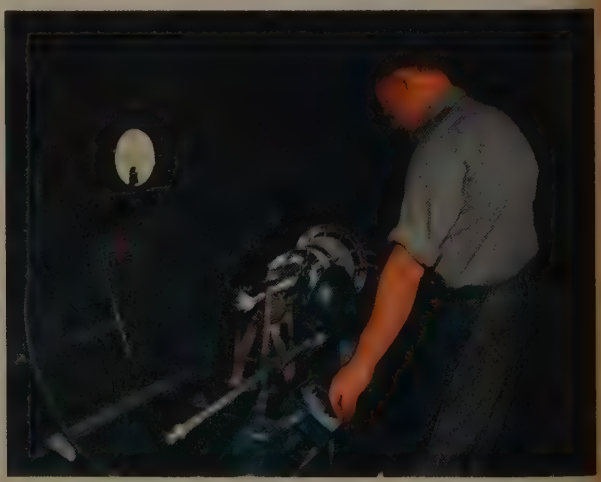
New FORTIFIED INSULATION . . . another step ahead. MYLAR*, a slot insulation with greater dielectric and mechanical strength. BONDAR, a wire insulation with more heat resistance. BONDITE, a stator insulation with greater strength to withstand destructive elements.



New PROTECTED HOUSING . . . another step ahead. Bracket openings are located in the under-quadrant for maximum protection. Brackets can be rotated for wall or ceiling mounting. Circumference of frame is *completely enclosed* so that it remains dripproof in *all* positions.



New ARMORIZED ENCLOSURE . . . another step ahead. The latest techniques in the casting art are utilized to fabricate more rugged housings that have greater application flexibility. Frame and ribbed feet are cast as a single unit for maximum rigidity. Wall sections are extra thick throughout.



New PRECISION MANUFACTURE . . . another step ahead. Each machining operation produces a new industry standard for concentricity. Improved rotor balance is attained through new precision tools. New rigid quality standards have been established for every component and the complete motor.

*Trademark for DuPont polyester film.

The new Life-Line A motor

..the big step ahead by Westinghouse

New? Yes, but not untried. The new Life-Line does not discard the past . . . it profits by it and builds upon it. Each component of the new Life-Line has been screened in the laboratory, then proved on production-line motors. You're not buying "theoretical" performance. The new Life-Line is a proved Life-Line.

GET THIS FREE BOOK

Here are all details on the new Life-Line "A" motor. Read about the new insulating materials—the new stator core—the new cooling methods—the new precision manufacturing techniques. Write for your copy of Booklet B-6154. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

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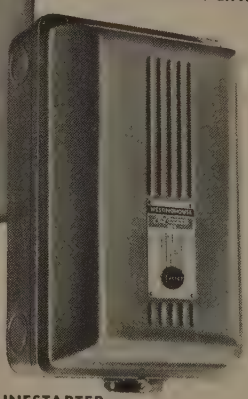
MOTOR WATCHMAN—MANUAL LINESTARTER

COMBINATION LIFE-LINESTARTER, MAGNETIC



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Comparison will do it—prove to you that the best controls for your machines come from Westinghouse.

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Westinghouse Electrical Controls include: Standard, Heavy-Duty and Oil-Tite* Pushbutton Units and Control Stations • Magnetic Controls featuring the advanced Life-Line Starter—uniform in design in NEMA ratings 0-4 • Manual Controls including Motor Snap Switch, Motor Sentinel*, Motor Watchman and the widely used NEMA 1A Manual Starter • Famous AB De-ion® Circuit Breakers • Control Components—relays (including the new, highly versatile Type N Relay), contactors, timers, transformers, terminal blocks and many other devices for control panels.

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ny instances results are better
ts, faster cycles, and fewer re-
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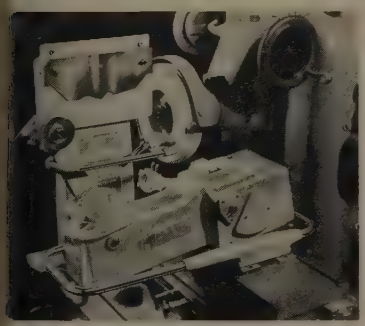
MORE DATA CIRCLE NO. 46 ON REPLY CARD

heel Forming Attachment

. handles medium sized work

Pratt & Whitney is marketing a
edium sized Diaform wheel form-
g attachment designed to sim-
ify the form-truing of grinding
heels up to 14 inches in diameter
ed for grinding dies, punches,
t or circular forming tools and
milar forms.

It offers a quick, accurate meth-
l of truing a given form up to



inches wide and 1 inch deep in
ne setting. The basic construc-
ion is a vertical pantograph, op-
rated by tracing a template to
uide a truing diamond across the
ace of the grinding wheel on a
to 1 ratio. Portable, it is made
n both right hand (for clockwise
otation) and left hand model (for
ounterclockwise wheel rotation).
Pratt & Whitney, division of Niles-
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FOR MORE DATA CIRCLE NO. 47 ON REPLY CARD

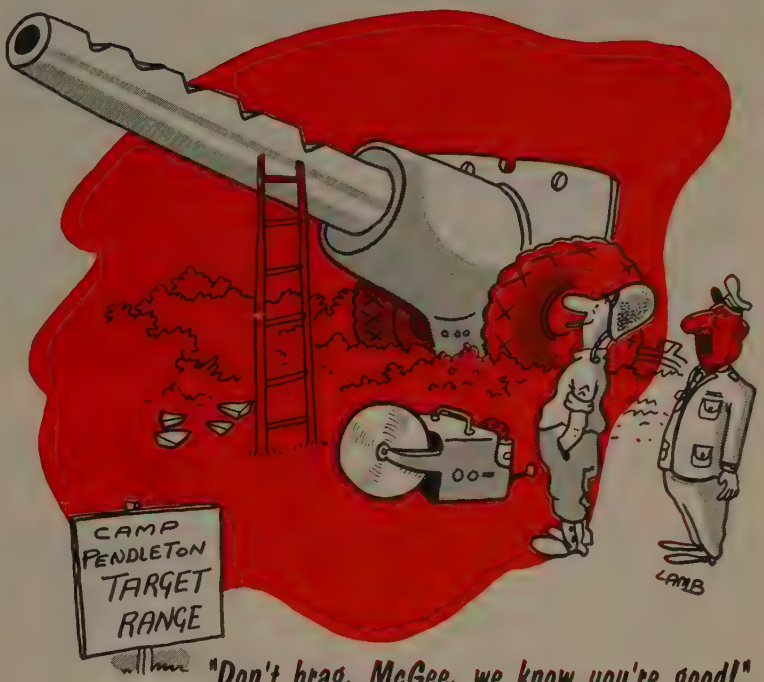
Protective Powder

. . of superior strength

Greater chemical resistant prop-
erties, superior physical strength
and economy are combined with
the stability and nontoxic quali-
ties of ordinary furfural alcohol
type cement in the new Pennsalt
Furan product.

It is highly resistant to acids,
alkalines and most solvents. In
addition, tests show it to have su-
perior physical strength and long-
er working life. It is available in

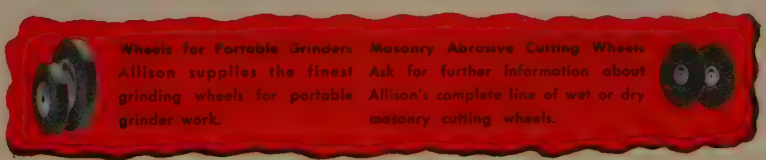
cut your costs . . . where you cut your materials



"Don't brag, McGee, we know you're good!"

Production managers who take the trouble to keep a careful, day-to-day record of cutting operations are quickly convinced of the efficiency and economy of the Allison Abrasive Cutting Method. The score is there for all to see.

Abrasive cutting with Allison Wheels cuts time, cuts effort, and cuts waste. It pays off in more pieces per hour at a lower cost per piece. For almost all materials to be cut, there is an Allison Abrasive Cutting Wheel to fit the job. For complete information on wet or dry cutting, ask Allison . . . specialists in abrasive cutting for thirty years.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Allison supplies the finest grinding wheels for portable grinder work.
Masonry Abrasive Cutting Wheels
Ask for further information about Allison's complete line of wet or dry masonry cutting wheels.

1AL54A

The *best* way to cut many materials . . .
the *only* way to cut some.

Allison ABRASIVE CUTTING WHEELS

THE ALLISON CO., 255 ISLAND BROOK AVENUE, BRIDGEPORT 8, CONN.

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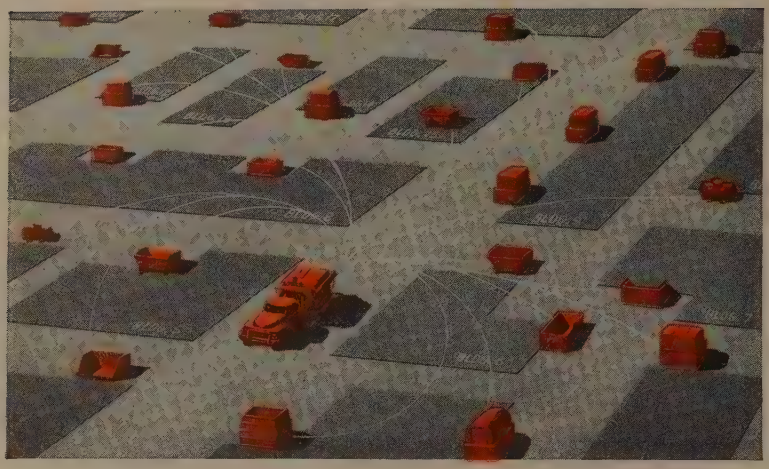
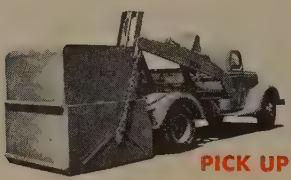


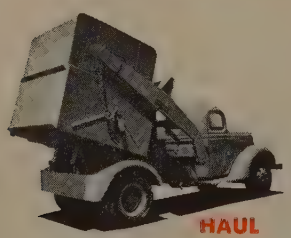
What you can do about your high cost of bulk Materials Handling

The picture above tells the whole story of the Dempster-Dumpster System of Bulk Materials Handling. Never before have you been able to cut bulk materials handling costs so drastically! One truck-mounted Dempster-Dumpster handles the entire group of Dempster-Dumpster Detachable Containers. It's like having scores of truck bodies for a single truck.

Containers are spotted at convenient materials accumulation points. When loaded each is picked up, hauled and emptied (as shown at left) . . . or load set down intact. Entire operation is handled by only one man, the driver, by hydraulic controls in cab.

Each container is designed and built in the desired size up to 12 cu. yds. to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. You can handle, at tremendous savings, materials of many descriptions—trash and waste materials, raw materials, finished products, etc.—with only one truck and only one man, the driver. Write to us for complete facts. Manufactured exclusively by Dempster Brothers, Inc.





THE DEMPSTER DUMPSTER® SYSTEM

DEMPSTER BROTHERS, 634 Dempster Bldg., Knoxville 17, Tenn.

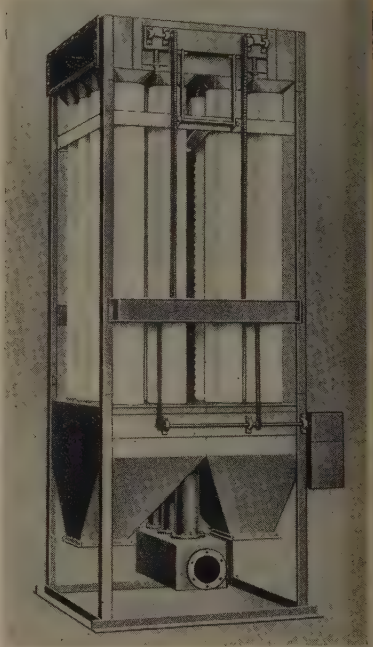
two formulations. Powder S, a siliceous filler, resistant to acids (except hydrofluoric), solvents, oils, grease, water, steam and mild alkalies. Powder C is a carbon type filler, an effective resistant for broad acid and alkali protection including hydrofluoric acid. Both powders are easily worked and may be handled safely. Pennsylvania Salt Mfg. Co.

FOR MORE DATA CIRCLE NO. 48 ON REPLY CARD

Air Filter

. . . maintains continuous cycle

The Amerjet dust collector is a reverse jet fabric model designed for applications where extremely fine particles are involved or where the material must be collected in a dry state for reclaiming.



Cleaning media are automatically reconditioned by a jet of high pressure air forced through the cloth in opposite direction to the flow of the air being cleaned. It maintains a constant pressure drop and thus a steady air volume at the exhaust points. Higher velocities are obtained and less filter cloth is needed than with conventional models, the manufacturer reports. Size of the dust collectors needed is thus materially reduced. American Air Filter Co.

FOR MORE DATA CIRCLE NO. 49 ON REPLY CARD

Announcing

WHEELING SOFTITE

TRADE MARK

GALVANIZED SHEETS

A new and revolutionary process*, incorporating the very latest manufacturing techniques developed and perfected by Wheeling engineers, now produces *a new and different galvanized sheet* known as "SofTite."

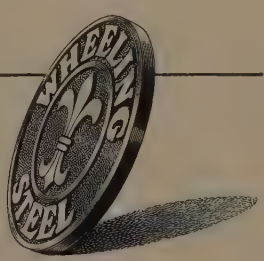
It is new and radically different, not merely because of its method of manufacture but because of its new and long-sought qualities and characteristics unachieved in the past by any other process.

The "SofTite" Galvanized Sheet is a signal achievement in sheet steel metallurgy after years of research and experiment—the combination of a soft, ductile steel base and an incomparably tight zinc coating.

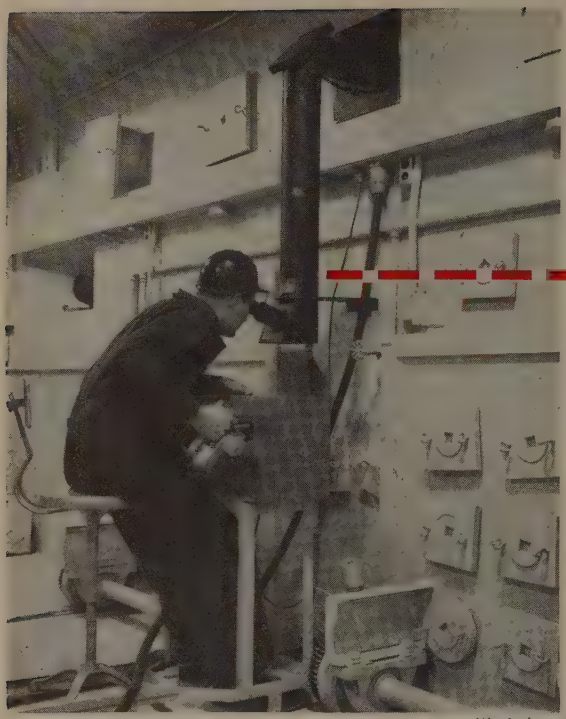
Ductile and tight-coated to a most amazing degree, "SofTite" forms freely and easily without the customary distortion by strains in the zinc coating which cause separation of the coating from the base metal.

Wheeling SofTite Galvanized Sheets can be supplied in both commercial and drawing qualities. Wheeling Steel Corporation, Wheeling, West Virginia.

*Covered by U. S. Pat. No. 2,647,305 and other patents pending.



IT'S WHEELING STEEL!



Westinghouse

Seven feet of concrete stand between this technician and the radioactive object he is dismantling remotely

Take a Look AT YOUR REACTOR ASSETS

Private industry is now being asked to develop materials for atomic energy projects. Here are a few that are being considered because of their application potential

NOW that private industry has been offered a partnership in AEC projects, progressive companies are taking stock of their nuclear reactor assets with renewed interest.

In general, opportunities lie ahead in structural, moderator, control, fuel and source materials. Materials that will not go to pieces in a reactor's heart must be found and proved. New instruments are needed. New kinds of pumps, controls, heat exchangers and safety devices must be developed.

The challenge is to find ways and means of capitalizing on the potential of the many materials being considered for atomic energy applications. Several of them are discussed in a *Reactor Handbook* recently prepared for the AEC by Battelle Memorial Institute.

Molybdenum—This is one of the metals that is expected to serve in reactors as a material of construction under high stress at temperatures above 1600°F.

In general, its yield and tensile strengths are increased (in the direction of working) as the amount of working increases. Yield and tensile strengths are decreased with an increase in annealing temperature, but annealing above 2500°F may cause low ductility at room temperature. It appears that purity is a significant determinant of response to annealing.

Creep Tests—Ductility of molybdenum is intimately related to the oxygen content of the material. A low ductility at elevated temperatures is not necessarily characteristic of the metal but rather of the test atmosphere. Specimens in a reducing (H_2) atmosphere show greater ductility than those in a vacuum.

A titanium-moly alloy has evidenced outstanding results. It was stressed by increments to 45,000 psi at 1800°F and 55,000 psi at 1600°F without rupture.

Vanadium—This metal has a potential as a structural material for fast reactors. Points in its favor: Low fission neutron cross section, small inelastic scattering cross section, high melting point, ductility and good physical properties.

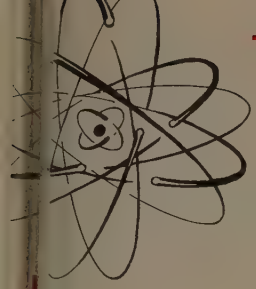
Mechanical Properties—There is little data on the mechanical properties of ductile vanadium. Metal is sensitive to small quantities of impurities. Oxygen, nitrogen and hydrogen readily embrittle it when heated in contact with the gases at temperatures much in excess of 575°F. For example, more than about 0.05 per cent oxygen makes the metal difficult to cold work.

Iodide metal, purest available, has a tensile strength of 31,600 psi and a uniform elongation of 17 per cent. Tensile strength of commercial ductile vanadium is more than twice that of the iodide metal and has less elongation. Properties of the calcium-reduced metal are in between these two.

Modulus of elasticity is relatively high (20×10^6 psi). Modulus-density ratios of steel and vanadium are practically the same.

Hardness, Creep—Rate of work hardening is low. Sheet ¼-inch thick can be cold rolled to 0.001 inch foil without intermediate anneals.

Preliminary survey stress-to-rupture tests on extruded calcium-reduced metal have been made at 1000°F. One bar failed on loading



MATERIALS FOR POTENTIAL ATOMIC ENERGY APPLICATIONS

Molybdenum and Its Alloys—

There are ten refractory metals that are liquid only above 3500° F. Of them, molybdenum is first in availability and fabrication methods. It is expected to serve as a material of construction in reactors, where stress is high and temperatures are above 1600° F. However, until ways of reducing its oxidation rate are found, it will be confined to use in nonoxidizing atmospheres.

Magnesium and Its Alloys—

Reactor applications of this material have been on a small scale, but two properties (lower thermal, neutron absorption cross section and high strength-to-weight ratio) give it potential utility.

Titanium and Its Alloys—

Because of its high strength-to-weight ratio and good corrosion resistance, titanium and its alloys show promise as structural materials. Metals with more desirable low thermal, neutron absorption cross sections have been preferred, but this objection may be of no consequence when structural materials for intermediate and fast reactors are considered.

Vanadium and Its Alloys—

Here is another structural material for fast reactors. Its favorable points include low fission neutron cross section, small inelastic scattering cross section, high melting point, ductility and good physical properties. Although transport cross section is small, the material has favorable alloying characteristics with uranium, making the metal of interest as a diluent. Thermal cross section is large, however, limiting its use in thermal reactors.

Cobalt-Base Alloys—

Under severe operating conditions of high temperature nuclear reactors, alloys of the superalloy (cobalt-base) classification will have utility. Superior elevated temperature properties somewhat offset high thermal neutron absorption of cobalt. At higher energies, its cross section is similar to molybdenum, but high residual activity is an undesirable characteristic. These alloys are being used in wear resistant components of reactors (such as guides for control rods); and they may be used to contain, protect and support fissionable material.

Rare Earths—

Applications probably will be for control purposes. Some of the rare earths have the highest thermal neutron cross sections of any of the elements. Gadolinium, for example, has a thermal absorption cross section of 44,000 barns. Cross sections of some heavier rare earths do not decrease as rapidly (with increasing neutron energy) as other elements.

Bismuth—

Material has a relatively low melting point and low absorption cross section for thermal neutrons. It has possibilities as a liquid, fuel carrying medium in nuclear reactors or as a liquid-metal coolant. It might find application as a constituent of low melting, liquid-metal control mediums in which high cross section would be supplied by another element.

Carbides—

Here we have high hardness and good thermal stability. Carbides of the transition elements are among the hardest and most refractory materials known. They are also chemically inert at ordinary temperatures. Some carbides, especially those of rare earth elements, are good conductors of electricity. Titanium carbide is outstanding for its thermal shock resistance and high tensile strength at elevated temperatures. Carbides may be used as refractories, fuels, radiation shields or structural materials.

Hydrides—

Much work has been done on the production of a suitable hydrogenous material for use as a moderator or radiation shield. Hydrides of heavy materials are of particular interest in the latter respect. Combination of hydrogen with a heavy metal as a hydride would afford high gamma absorption, as well as good neutron attenuation. Best hydride for shield purposes should have maximum hydrogen, high density and should be a solid that is stable at higher temperatures. Any hydride used as a radiation shield must have a container impervious to hydrogen and capable of withstanding relatively high pressure — estimated tensile strength is about 50,000 psi at 1200° F. Low-carbon stainless and Nichrome are suitable for containers.

Cements and Concretes—

Both have been used extensively (in monolithic and block forms) to shield large stationary reactors, equipment in radiochemical labs and plants and cyclotrons.

Others—

Aluminum and zirconium are now being used in atomic reactor applications.

Electro Metallurgical Co.

Machining slab of pure vanadium. Part of standard dimensions can be produced with good surface finish

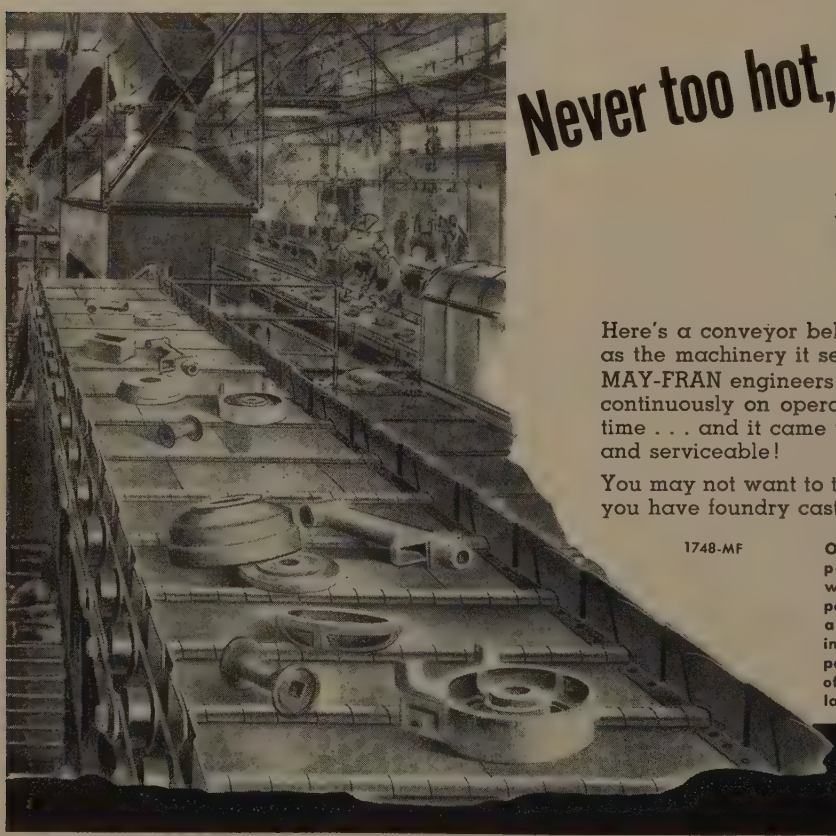
to 23,100 psi; a second stressed at 18,000 psi failed in 60 hours and 7 per cent elongation. But bar had a defect in the reduced section that probably influenced results. Third bar withstood 1100 hours at 16,000 psi without failure. After 1100 hours, load was increased daily and the bar failed at 28,000 psi after 200 more hours, with a total elongation of 15 per cent.

Alloys—With exception of vanadium-uranium, vanadium-titanium and vanadium-iron systems, vanadium-rich alloys have not been studied extensively. Uranium-rich alloys have good fabricating properties, and alloys up to 15 atomic-per cent vanadium have been hot rolled at 1100°F. Vanadium also appears to be an effective solvent metal for most metallic elements, and possibilities for alloy development are broad.

The oxygen-vanadium system is of considerable importance, because of the embrittling effect of exceedingly small quantities of this element. Solubility studies indicate that several atom-per cent of oxygen are interstitially soluble in the body-centered cubic structure. Further addition of oxygen results in a two-phase region of a body-centered tetragonal phase and cubic phase. Region persists to about 15 atom-per cent at which the composition of the structure is completely body-centered tetragonal.

Magnesium—Low thermal neutron absorption cross section and high strength-to-weight ratio make this a material of potential utility. For structural applications, it is alloyed with metals such as aluminum, zinc, zirconium and manganese—aluminum, unlike magnesium, is now being used extensively in nuclear reactor applications.

Low neutron capture cross section makes magnesium an interesting material for reactor applications. But retention of a low neutron capture cross section in



Never too hot, never too heavy

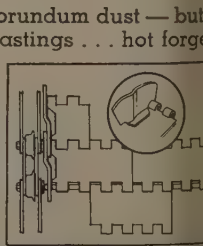
MAY-FRAN

Here's a conveyor belt built to take it . . . to last as lo as the machinery it serves! Once installed, it's in to st MAY-FRAN engineers poured abrasive carborundum d continuously on operating belt for a prolonged period time . . . and it came through this grueling test still int and serviceable!

You may not want to transport carborundum dust — bu you have foundry castings . . . die castings . . . hot forg

1748-MF

Outside links incorporate interlocking wings . . . remain positively engaged at all times. New interlocking flanges permit staggering of links . . . eliminate lateral movement.



MAY-FRAN

ys restricts the number of ele- nts with which it may be al- ed for strengthening purposes. ements that would least in- ase capture cross section are minum, calcium, lead, silicon, and zirconium. Beryllium and muth would reduce cross sec- n.

Magnesium alloys containing up 0.5 to 1 per cent pure cerium er the most promise for ele- ted - temperature applications, ere neutron capture cross sec- n is an important limiting fac- .

Titanium — High strength-to- ight ratio and good corrosion sistance of titanium and its al- ys make them attractive for ructural applications. Titanium s been called the sister metal zirconium, but titanium does t have the low thermal neutron sorption cross section that has ade zirconium excellent for re- tor use. This objection to ti- nium should be of no conse- ence when structural materials r intermediate or fast reactors e considered.

CREEP-RUPTURE PROPERTIES OF RECRYSTALLIZED ARC-CAST MOLYBDENUM

Stress, PSI	Rupture time, hr	Elongation, %	Reduction of area, %	Approximate minimum creep rate, %/hr
		1600°F in vacuum		
32,500	0.2	47.1	84.0	..
25,000	9.6	60.8	85.0	..
20,000	70.4	64.7	88.0	0.40
18,500	110.4	60.5	82.3	.06
		1600°F in hydrogen atmosphere		
25,000	3.8	55.4	87.7	..
20,000	31.7	60.3	88.5	0.85
16,500	135.7	65.5	90.8	.21
		1800°F in vacuum		
20,000	2.0	70.3	85.0	..
15,000	14.0	41.3	81.0	..
12,500	57.7	40.6	81.0	0.50
10,000	482.0	17.4	48.9	.013
		1800°F in hydrogen atmosphere		
20,000	1.3	54.2	87.1	..
15,000	11.2	72.1	93.4	..
12,500	34.4	62.9	92.9	..
10,000	146.8	79.6	91.4	0.14

Cobalt-base Alloys—This group of materials is expected to have utility under the severe operating conditions of high-temperature nuclear reactors.

Generally, high temperature properties offset high thermal neutron obsorption of cobalt. The super-alloys may be used to contain, protect and support fissionable material.

This article is based on unclassified portions of a report by Battelle Memorial Institute to the AEC. Authors include M. C. Udy, M. W. Mallett, V. M. Sheipline, M. J. Snyder, M. W. Mote, P. D. Frost, R. M. Parke, J. A. VanEcho, W. E. Few, L. E. Olds, H. R. Ogden, R. B. Fischer, J. R. Keeler, E. Eichen and J. H. Jackson.

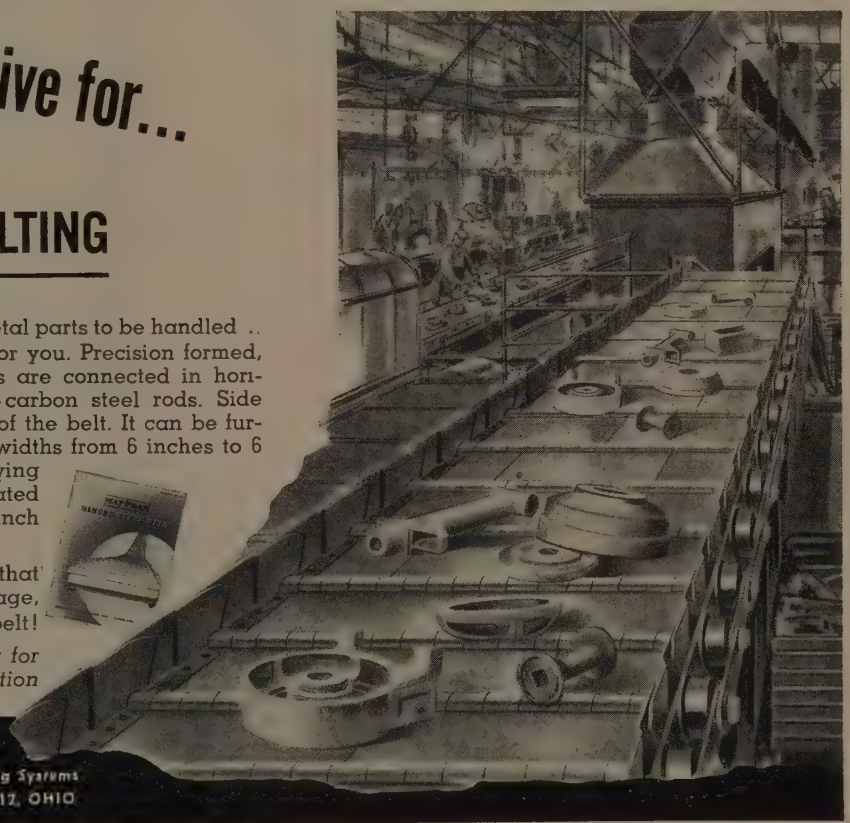
ever too abrasive for...

HNGED-STEEL BELTING

ms...hot, heavy or abrasive metal parts to be handled .. AY-FRAN hinged-steel belt is for you. Precision formed, avy-gauge hinged-steel links are connected in hori- ntal rows by means of high-carbon steel rods. Side ains become an integral part of the belt. It can be fur- shed to your specifications in widths from 6 inches to 6 t and in any length or carrying pacity. Both solid and perforated ks are available in 2½ to 12-inch ch lengths.

you want conveyor belting that n withstand the roughest usage, ecify MAY-FRAN hinged-steel belt!

Write today for complete information



NGINEERING, INC.

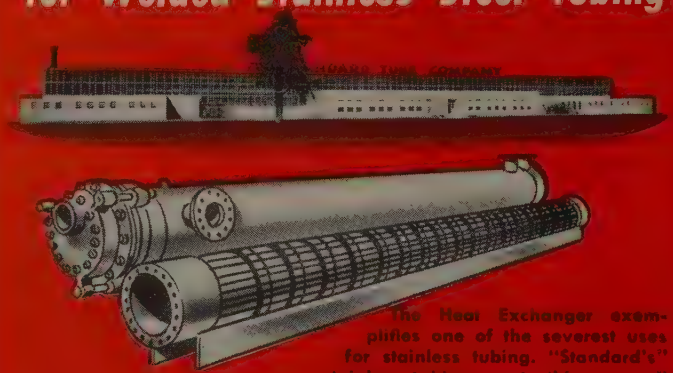
gners and Builders of Complete Handling Systems

5 CLARKSTONE ROAD • CLEVELAND 12, OHIO

Keep in Step with—

STAINLESS TUBING USERS WHO KNOW!

SPECIFY "Standard" for Welded Stainless Steel Tubing



The Heat Exchanger exemplifies one of the severest uses for stainless tubing. "Standard's" stainless tubing meets this, as well as many other different requirements for strength, and heat and corrosion resistance.

Deal with the Specialist among Specialists

A tubing specialist, like other specialists, knows his trade best.

When you deal with "Standard" you deal with a tubing specialist who manufactures millions of feet of tubing every month from stainless and carbon steel—and for 25 years has been serving all types of industry for mechanical and pressure tubing applications.

If you need stainless tubing, be sure you specify "Standard". It pays to deal with the tubing specialist among specialists.

Stainless Tubing Size and Thickness
¼" O.D. to 4½" O.D.
.020 to .154 wall
Carbon Steel Tubing
½" O.D. to 5½" O.D.
.028 to .260 wall

Specialized Brushing

A power brushing method for removing feather burrs from a machined slot in an aluminum fuse component has increased production by more than 300 per cent.

Gilman Engineering Co., Wisconsin, was faced with the burr removal problem. Hand methods

ROTATING BRUSHING MACHINE
. . . removes edge on bottom of slot

for doing the job, with output of 360 units per hour, proved too slow and left poorly finished edges.

Specialists Lend a Hand—Power brushing specialists from Osborn Mfg. Co., Cleveland, helped company engineers construct a rotating brushing machine equipped with three Osborn .005 wire wheel brushes. There are 16 spindles on the table. The aluminum fuse parts do not rotate, they rest on the pins. The table rotates clockwise at two revolutions per minute, while the brushes run at 3450 rpm.

The first brush in position rotates clockwise against the slot. The brush in second position rotates counter clockwise to brush the other side of the slot edge. A third brush sweeps down through the slot to finish the bottom edge.

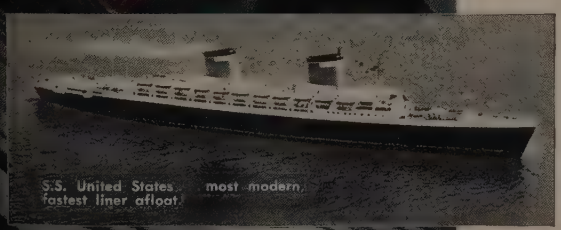
The slots come clean and smooth at a rate of 1400 units per hour, an increase of 1040 units of higher quality.

Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.



S.S. United States... most modern, fastest liner afloat.

ROEBLING CF&I

A subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Yes, you can set your watch *both* by Bristol's service and quality, when you need *Clock Brass.*

For this modern mill is one of the largest and longest-experienced makers of this product . . . *and no one makes it better.*

Bristol *Clock Brass* comes to you "on the button" . . . in large coils, without welds . . . with width and gage tolerances consistently uniform. And all gears and parts blanked from it are remarkably free from burrs.

Ask any manufacturer (and there are scores of them) who fabricates parts from Bristol *Clock Brass* . . . he'll tell you what we mean by "Bristol-Fashion."

THE BRISTOL BRASS CORPORATION has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21.

"*Bristol-Fashion*" means **Brass at its Best**

STEEL

March 8, 1954

Market Outlook

STEEL INGOT production edged down last week to the lowest point this year. Declining 1.5 points from the preceding week, output in the week ended Mar. 7 registered 70 per cent of capacity.

Highest point attained this year was 75.5 per cent in January.

BRIGHT RAYS—In contrast to the current declines in ingot production are scattered reports of improvement in new ordering. One stimulating feature is the increasing number of rush orders at both warehouse and mill levels. This indicates that at least some consumers have worked their stocks to a low point. Although orders received by warehouses are increasing in number they are generally small. No longer do consumers feel it necessary to carry larger stocks; they're confident they can buy what they need when they need it.

IMPROVED—A sector from which an improvement in demand has been noted is the agricultural implement producers; they are substantial users of bars. Some steelmakers report gains in farm implement production have raised sales of bars by 10 per cent over a month ago. This is not as much seasonal improvement as has been experienced from these consumers before, and mill order books for bars are far from filled.

STRENGTH—While plates are not in as strong demand as they were they are still at a higher rate than most other steel products. Among consumers from which demand is slow are shipbuilders and railway car producers. Sales to producers of barges and towboats remain good, indicating effects of the search for cheaper means of freight transportation by industry.

Structural activity remains spotty. Estimating departments are more active than they were, but contracting continues to be light.

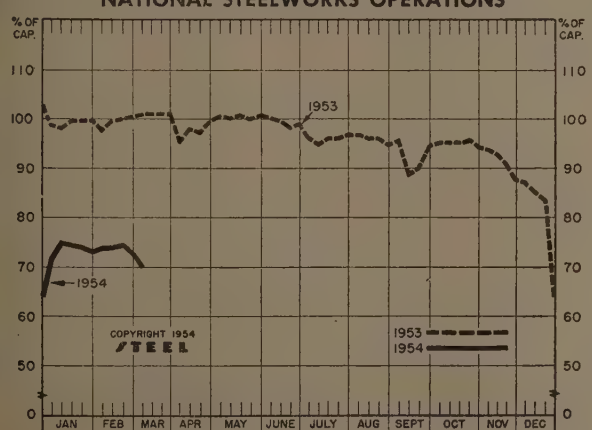
OVERSUPPLY—Tin plate demand may weaken in the Chicago area this year if predictions of reduced canning are borne out. In Wisconsin, for example, it is reported that acreage for peas and corn probably will be cut. Both items are in long supply and the market prices have been below costs. Some canneries likely will not open during the coming summer.

Orders for wire are up slightly and are increasingly diversified.

SAVINGS—Riding the buyers' market, consumers are increasingly inclined to haggle over prices. In one area, carbon sheet costs to consumers average $3-$3.50 a ton lower than in the third quarter of last year as a result of freight absorption and revision or waiving of price extras by steel producers. Cost of low-carbon cold-rolled steel strip in that area is down by as much as $12 a ton. New freight rates in another month will further reduce steel costs to users.

PRICE TRENDS—Standard base prices of steel remain firm, however. This is reflected by STEEL's price composite on finished steel. For the eleventh consecutive week it was $113.91 a net ton in the week ended Mar. 4. On the other hand STEEL's price composite on steelmaking scrap continues to drop in response to the weakened rate of steel output. That composite in the week ended Mar. 4 was $24.50 a gross ton, down $1 from the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Mar. 7	Change	Same Week 1953	Same Week 1952
Pittsburgh	81.5	— 1.5*	107	103.5
Chicago	82	— 1*	103.5	103
Mid-Atlantic	69	— 3	96	98
Youngstown	70	— 4	107	105
Wheeling	82	+14	101	100
Cleveland	66	— 8	104	98.5
Buffalo	63.5	— 5	106.5	104
Birmingham	80	0	98	104
New England	65	+ 7	85	90
Cincinnati	72.5	+ 1.5	101	92
St. Louis	43.5	0	96	79
Detroit	63.5	— 8.5	105	102
Western	80.5	0	110.5	103
National Rate	70	— 2.5	101	101.5

INGOT PRODUCTION‡

	Week Ended Mar. 7	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	104.7†	109.4	110.4	140.8
NET TONS (In thousands)	1,682†	1,756	1,774	2,262

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

The Metalworking Outlook—p. 65 Technical Outlook—p. 115

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Mar. 2

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.675	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.4
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	4.975	Tin plate, electrolytic, 0.25 lb	7.1
Tie Plates	5.125	Bars, H.R., carbon	4.873	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.2
Axles, railway	7.250	Bars, reinforcing	4.863	Pipe, galv., buttweld (100 ft)	17.567	Wire, drawn, carbon	7.7
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.940	Pipe, line (100 ft)	141.960	Wire, drawn, stainless, 430 (lb)	0.5
Plates, carbon	4.550	Bars, C.F., alloy	11.075	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.6
Structural Shapes	4.367	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8d common	7.4
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.765	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	8.7
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.704	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.0
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075	Sheets, galvanized	6.875	Tubing, mechanical, stainless, 304 (100 ft)	161.193		
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.000				
		Strip, C.R., carbon	7.243				

‡Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Mar. 2 1954	Feb. 23 1954	Month Ago	Feb. Average
(1947-1949=100)	140.9	140.9	141.3	140.9

STEEL's FINISHED STEEL PRICE INDEX

	Mar. 4 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.74	189.74	189.74	181.31	154.85
Index in cents per lb	5.140	5.140	5.140	4.912	4.195

STEEL's ARITHMETICAL PRICE COMPOSITE*

	Mar. 4 1954	Week Ago	Month Ago	Year Ago	5 Yr Ag
Finished Steel, NT	$113.91	$113.91	$113.91	$110.98	$97.32
No. 2 Fdry Pig Iron, GT	56.54	56.54	56.54	55.04	46.63
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	46.22
Malleable Pig Iron, GT	57.27	57.27	57.27	55.77	47.34
Steelmaking Scrap, GT	24.50	25.50	27.83	45.00	37.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54 of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Mar. 4 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.45
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.502	3.816
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.275
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, deld., Philadelphia	4.38	4.38	4.38	4.13	3.492
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.50
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.10	4.10	4.20	4.35	3.75
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.10	4.10	4.20	4.35	3.95
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.275
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.10-5.30	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.00
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.45-6.05	5.30-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.475-5.225	4.325
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.35	5.775
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	Mar. 4 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	46.00
Basic, deld. Phila.	59.66	59.66	59.66	59.25	50.30
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, deld. Phila.	60.16	60.16	60.16	59.75	50.80
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	43.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	49.43
Malleable, Valley	56.50	56.50	56.50	55.00	46.50
Malleable, Chicago	56.50	56.50	56.50	55.00	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	228.00*	163.00*

*78-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$25.50	$27.50	$29.50	$44.00	$39.00
No. 1 Heavy Melt, E. Pa.	23.00	24.00	27.00	48.50	39.00
No. 1 Heavy Melt, Chicago	25.00	25.00	27.00	42.50	34.00
No. 1 Heavy Melt, Valley	23.50	24.50	28.50	45.25	37.75
No. 1 Heavy Melt, Cleve.	20.50	21.50	26.50	44.25	36.50
No. 1 Heavy Melt, Buffalo	25.00	25.00	25.00	43.50	39.50
Rails, Rerolling, Chicago	36.50	36.50	36.50	53.50	45.75
No. 1 Cast, Chicago	30.50	29.50	29.50	43.00	41.50

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$14.50
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	17.00
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 43, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg, $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 29.75-30.00 deld. Conn. Valley, 29.875-30.125 deld. Midwest; Lak 30.00 deld; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $165-$175 per troy oz.

Lead: Common 12.30, chemical 12.40, cor roding 12.40, St. Louis, New York basis, ad 0.20.

Lithium: 98%, $11-$14 per lb, depending o quantity.

Magnesium: 99.8%, selfpalletizing pig 27.00 notched ingot 27.75, 10,000 lb or more, f.o.b Freeport, Tex. For Port Newark, N. J., an Madison, Ill., add 1.20 for pig and 1.25 fo ingot. Sticks, 1.3 in. diameter, 46.00, 100 t 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Ad 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York $191-$194 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 i and larger), unpacked 60.00; 25-lb pigs 62.65 "XX" nickel shot 63.65; "F" nickel shot 6

DAILY NONFERROUS PRICE RECORD

	Price Mar. 4	Change		Previous Price	Feb. Avg.	Jan. Avg.	Mar. 1953 Avg.
Copper	29.75-30.00	Mar.	3	29.50-30.00	29.750	29.750	30.510
Lead	12.30	Feb.	18	12.80	12.610	13.060	13.300
Zinc	9.25	Feb.	15	9.50	9.369	9.760	11.000
Tin	87.25	Mar.	4	87.00	85.181	85.100	121.500
Nickel	60.00	Jan.	14	56.50	60.000	60.000	60.000
Aluminum	21.50	July	15	20.50	21.500	21.500	20.500
Magnesium	27.00	Mar.	9	24.50	27.000	27.000	24.500

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, deld.; Magnesium 99.8%, Freeport, Tex.

...ts for addition to cast iron, 60.00; prices ...b. Port Colborne, Ont., including import ...y. New York basis, add 0.92.

...ium: $140-$150 per troy oz nom.

...adium: $22-$24 per troy oz.

...tinum: $91-$93 per troy oz from refineries.

...lium: $16-$21.50 per mg radium content, ...ending on quantity.

...dium: $125 per troy oz.

...henium: $75-$80 per troy oz.

...nium: 99.5%, $5-$6 per lb.

...lum: 16.50, carlots; 17.00 l.c.l.

...talum: Sheet, rod $39.00 per lb; powder ...50 per lb.

...lurium: $1.75 per lb.

...allium: $12.50 per lb.

...: Straits, New York, 87.25.

...anium: Sponge, 99.3+ %, $5 per lb.

...gsten: Powder, 98.8%, carbon reduced, ...0 lb lots $4.95 per lb f.o.b. shipping point; ...s than 1000 lb $5.10; 99+% hydrogen re...ed, $5.85. Treated ingots $7.95.

...c: Prime Western 9.25, brass special 9.50, ...ermediate 9.75, E. St. Louis, freight al...ed over 0.50 per pound. High grade 10.60, ...ecial high grade 10.75, die casting alloy ...ot 13.25, deld.

...conium: Sponge $10 per lb; powder elec...nics grade $15, flash grade $11.50.

(...ote: Chromium, manganese and silicon met... are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

...uminum Ingot: Piston Alloys 18.75-19.50; ...12 foundry alloy (No. 2 grade) 18.25-...00; 5% silicon alloy, 0.60 Cu max., 21.50-...00; 12 alloy, 0.60 Cu max., 21.50-22.00; ...5 alloy 20.50-21.00; 108 alloy 19.00-19.50; ...ed deoxidizing grades, notch bars, granu...ed or shot: Grade 1, 19.50-20.00; grade 2, ...00-19.00; grade 3, 17.00-17.50; grade 4, ...50-17.00.

...ass Ingot: Red brass, No. 115, 23.50; tin ...onze No. 225, 34.25, No. 245, 28.50; high...ded tin bronze, No. 305, 27.75; No. 1 ...llow, No. 405, 19.75; manganese bronze No. ...1, 24.25.

...agnesium Alloy Ingot: AZ63A, 31.50; AZ91B, ...00; AZ91C, 31.50; AZ92A, 31.50

NONFERROUS MILL PRODUCTS

COPPER WIRE

...are, soft, f.o.b. eastern mills, 100,000 lb lots, ...36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weath...proof, 100,000 lb, 36.28; 30,000 lb, 36.58; ...l, 37.03. Magnet wire deld., 15,000 lb or ...re 41.83; l.c.l., 42.58.

LEAD

...Prices to jobbers f.o.b. Buffalo, Cleveland, ...ttsburgh.) Sheets, full rolls, 140 sq ft or ...re $17.50 per cwt; pipe, full coils $17.50 ...r cwt; traps and bends, list prices plus 30%.

TITANIUM

...Prices per lb, 100,000 lb and over, f.o.b. mill.) ...heets, $15; sheared mill plate, $12; strip, $15; ...ire, $10; forging billets, $6; hot-rolled and ...rged bars, $6.

ZINC

...heets 23.00, f.o.b. mill, 36,000 lb and over. ...ibbon zinc in coils, 19.50-20.50, f.o.b. mill, ...6,000 lb and over. Plates 19.00-22.25.

ZIRCONIUM

...late $27; H.R. strip $28; C.R. strip $35; ...orged or H.R. bars $27; wire, 0.015 in., 1 ...ent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
...heet, C.R. ...	66.5	67.5	92.5
...trip, C.R. ...	92.5	70.5	98.5
...late, H.R. ..	84.5	68.5	90.5
...tod, Shapes ..	82.5	65.5	86.5
...eamless Tubes	115.5	100.5	137.5
...hot, Blocks ..	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed over 499 lb)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.1
75S-T6*	47.1	53.7

* 24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	——Round—— 11S-T3	17S-T4	—Hexagonal— 11S-T3	17S-T4
Drawn				
0.125	50.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares. Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 108.00, 0.064-in. 51.00, 0.125-in. 71.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 53.00, 20,000 lb or more 0.188-1.0 in. thick, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clipping 11.00; low copper clippings 11.00; mixed clippings 9.00-10.00; old sheet 8.00-9.00; borings and turnings 5.50; pistons and struts 5.50; crankcases 8.00-9.00; industrial castings 8.00-9.00.

Copper and Brass: Heavy copper and wire, No. 1 23.00-23.50; No. 2 copper 19.00-19.50; light copper 16.50-17.00; No. 1 composition red brass 16.00-16.50; No. 1 composition turnings 15.50-16.00; mixed brass turnings 10.00-10.50; new brass clippings 15.50-16.00; No. 1 brass rod turnings 11.00-11.50; light brass 9.50-10.00; heavy yellow brass 11.50; new brass rod ends 13.50-14.00; auto radiators, unsweated, 12.00-12.50; cocks and faucets 13.50-14.00; brass pipe 15.00.

Lead: Heavy 9.50; battery plate 5.00-5.50; linotype and stereotype 12.00; electrotype 10.50; mixed babbitt 11.00-11.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 24.00-26.00; old sheet 22.00-24.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 40.00-45.00; block tin pipe 65.00-67.00; No. 1 babbitt 37.00-38.00.

Zinc: Old zinc, 3.25; new die cast scrap, 3.00; old die cast scrap, 3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 13.50-14.00; 51S, 52S clippings 13.50-14.00; 14S, 17S, 24S clippings 12.00-12.50; mixed clippings 12.00-12.50; old sheet 10.50-11.00; old cast 10.50-11.00; clean old cable, free of steel 13.50-14.00; borings and turnings 10.50-11.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.50-22.00; refinery brass (60% copper) per dry copper content 21.00; auto radiators, 14.25, nominal.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.50-22.00; No. 1 composition solids 18.00; heavy yellow brass solids 14.00; yellow brass turnings 13.00; radiators 14.50.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.75 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.045; 200-499 lb $1.03; 500-999 lb $1.025; 1000 lb or more $1.02.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 2000 lb 29.00; over 2000 lb 28.75.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00, 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80, 1000-19,900 lb 18.80, 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 67.7; 100-600 lb 53.7; 700-1900 lb 51.1; 2000-9900 lb 49.4; 10,000 lb or more 48.3.

Stannous Chloride (Anhydrous): Less than 50 lb $1.527; 50 lb $1.137; 100-300 lb $1.037; 400-900 lb $1.013; 100-1900 lb 98.8; 2000-4900 lb 95.2; 5000-19,000 lb 89.1; 20,000 lb and over 83.00.

Stannous Sulphate: Less than 50 lb $1.229; 50 lb 92.9; 100-1900 lb 90.9; 2000 lb and over 88.9.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.33b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.00d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.23	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90% ..	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5% ...	66.58	67.03	67.03	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.82	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Nonferrous Metals

Lower copper prices? There's only a slight chance for a drop in the next 60 days. Copper output is being cut to match the general economic activity

ONLY slight chance exists for lower copper prices in the next 60 days.

Copper fabricators, who have maintained close vigil over supplies for nearly nine months in anticipation of a decline, must continue their waiting game.

Overpriced? — "I don't consider copper overpriced at 30 cents," the president of a large independent Connecticut brass company said. A copper authority comments: "Too many people think copper must follow lead and zinc. The metals are no longer in the same basket—the production and demand picture is different today."

Copper companies are inclined to agree with these men. They're cutting output now to coincide more closely with general economic activity. The action is not so much an attempt to protect the price as it is to return production facilities to a normal peacetime basis.

With output schedules trimmed realistically to anticipated demand, firmness of the present price is enhanced. Custom smelters, confronted last week with buyers of copper at 29.50 cents and finding scrap prices climbing under stimulus of export demand, upped quotations to 29.75, first change since October.

Chile, Too—The big U. S. copper companies mining in Chile are scaling down operation there, too. Kennecott's Braden Copper Co. asked government permission to reduce production and personnel by 31 per cent, which would cut monthly output to a bit over 10,000 tons.

Also said to be in the works is a 30 per cent operating drop at Anaconda's huge Chuquicamata mine; present monthly rate is about 15,000 tons. Both reductions are dependent on approval by the Chilean government.

Western Shutdowns—U. S. mine curtailments announced in 1954 average about 15,000 tons, or close to 51 per cent of 1953's monthly operating rate, affecting four U. S. firms.

Copper men believe production will be much closer to current demand; March buying is stronger than February's and there's considerable opinion that inventory consumption by fabricators is further along than is indicated by trade statistics. Because copper use closely parallels general economic activity, copper men believe a Federal Reserve Board industrial production index of 115 to 120 will require about 115,000 tons of copper a month. That would make 1954 the third-best year in the industry's history.

Speculators Boost Tin

Speculators, betting on an international tin agreement to be executed last week, sent the price jumping right out of its narrow rut of recent months. Equally contributing to the spurt were optimistic reports of agreement between the U. S. and Indonesia for up to 20,000 tons of tin and concentrates over the next year. It's the third and last year of the contract; price terms are the stumbling block.

STEEL's Metal Price Averages for Feb., 1954
(Cents per pound)

Electrolytic Copper, del. Conn.	29.750
Lead, St. Louis	12.610
Prime Western Zinc, E. St. Louis	9.369
Straits Tin, New York	85.181
Primary Aluminum Ingots, del.	21.500
Magnesium, Freeport, Tex.	27.000
Nickel, f.o.b. refinery	60.000

At a Washington meeting on the proposed international tin agreement, diplomats and industry men presented diametrically opposite views on whether the U. S. should ratify the pact. The State department thinks it necessary to fight Communism. Industry thinks that may be the job of government, but tin consumers shouldn't be saddled with the obligation more than anyone else. Particularly voluble were representatives of the steel industry. Said one man privately: "This bleeding hearts program" won't work. It has been tried several times as far back as 1918, and broke down when a chance to jack up the price presented itself. Other representatives quarrel not so much with the scheme as with the price range, 83 cents to $1.13, arrived at "by negotiation," a State department man admitted.

June 30 is the deadline for signing the agreement, which has about a 50-50 chance of going through without U. S. help. Essentially, the problem is one of over-production—by 3000 to 5000 tons a months, according to one estimate. Also there's a year's production from the Texas City smelter lying on the ground there, in addition to an overbrimming stockpile. Closing of the Texas City operation this year is a foregone conclusion. Even with the U. S. taking a "benevolent attitude" and the buffer pool plan going into effect, its chances of success for long are considered dim.

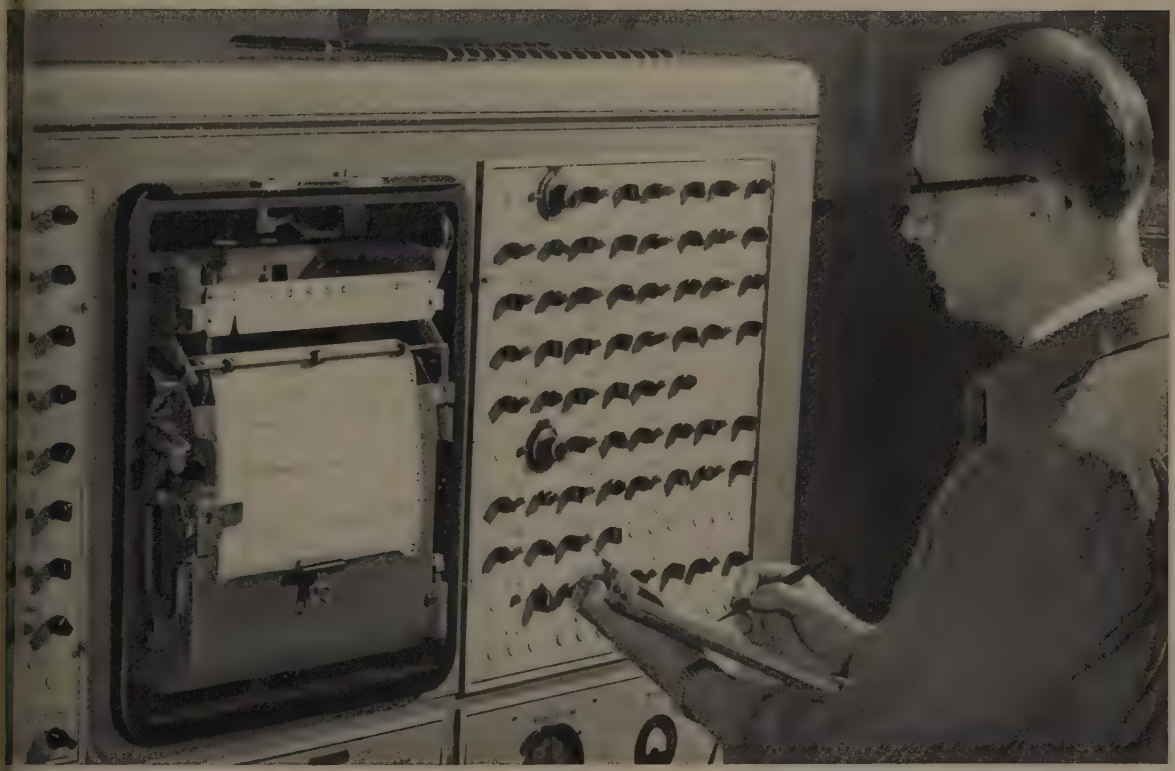
Pace-Setting Contract

The contract that historically sets the pace in brass mills was signed last week after months of negotiations. Chase Brass & Copper Co. and the UAW-CIO agreed on a five-cent-an-hour direct wage increase in a package valued between 11 and 12.5 cents. The one-year agreement was retroactive to Oct. 16, 1953, affects about 3500 employees and contains no reopening clause or cost-of-living adjustment provision. Work continued throughout negotiations. Most other brass company contracts come up for settlement this summer.

Nonferrous Briefs

- "Very little if any improvement can be expected in the market price until production of slab zinc in the U. S. plus slab zinc imports is brought into line with domestic consumption," said American Zinc, Lead & Smelting Co. in announcing another output cut of 450 tons monthly, effective last week.
- Another half-cent price cut was made on free-cutting brass rod; new base is 34.00 cents.
- Expectation that import controls will loosen in Japan has sent the export scrap market searching for metal, sending copper scrap prices up as much as 1 cent a pound in seaboard markets.
- Aluminum production in the first three qurters of 1954 will be 21,000 tons higher than in the final three quarters of last year, the General Services Administration estimates.
- Lead sales have perked up in recent weeks; even the scrap lead market has improved.

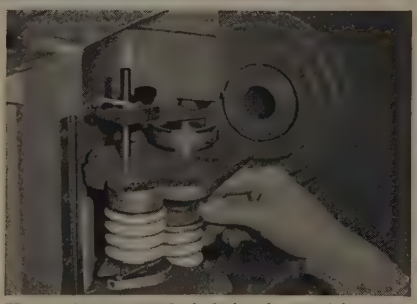
SURE, we're sure you're getting the right copper alloy!



CHASE metallurgists use fantastically accurate instruments to check the brass shipped to you in wire, rod, sheet or tube.

The Quantometer, for instance, tests a brass sample for 18 elements in 1½ minutes.

An Electron Microscope, Spectroscope, and an X-ray Diffraction Unit are also part of Chase laboratory equipment so that we can be absolutely certain that the Chase brass you buy has exactly the right composition, grain structure, temper, dimensions and other physical characteristics your product requires.



Here a brass sample is being inserted into the arc-spark stand of the Quantometer for analysis. In a matter of only 1½ minutes, sample will be completely analyzed.

Chase® BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass & Copper

Albany†	Cleveland	Kansas City, Mo.	New York	San Francisco
Atlanta	Dallas	Los Angeles	Philadelphia	Seattle
Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	
Chicago	Houston	Newark	Rochester†	(†sales
Cincinnati	Indianapolis	New Orleans	St. Louis	office only)

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 179. Key to footnotes, page 181.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS, Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa, Pa. J5 ....$62.00
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 .....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Canton,O. R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3..82.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....83.50
Johnstown,Pa. B2 .....75.50
Lackawanna,N.Y. B2 ..75.50
Los Angeles B3 .....85.00
Munhall,Pa. U5 .....75.50
Seattle B3 .....89.00
So.Chicago R2,U5,W14 75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ....85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....90.00
Ind.Harbor,Ind. Y1 ...82.00
Johnstown,Pa. B2 .....82.00
Lackawanna,N.Y. B2 ..82.00
Los Angeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14 82.00
So.Duquesne,Pa. U5 ...82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo,R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ....$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ....3.75

WIRE RODS
AlabamaCity, Ala. R2..4.525
Aliquippa,Pa. J5 .....4.525
Alton,Ill. L1 .....4.70
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 .....4.525
Fontana,Calif. K1 ....5.325
Houston S5 .....4.925
Johnstown,Pa. B2 ....4.525
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ....4.865
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 .....4.725
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ...5.175
Portsmouth P12 .....4.525
Roebling,N.J. R5 .....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2..4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ...4.825

STRUCTURALS

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Bessemer,Ala. T2 .....4.10
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.80
Minnequa,Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....4.15
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14.4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.35

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 ....5.10
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 .....4.10
Phoenixville,Pa. P4 ....4.95
So.Chicago,Ill. U5 .....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 ....6.175
Bethlehem,Pa. B2 .....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ...6.175
Ind.Harbor, Ind. Y1 ...6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ..6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5, W14 6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ..6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

BEARING PILES
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

PILING

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky. (15) A10..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 .....4.10
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 .....4.10
Conshohocken,Pa. A3 ..4.10
Ecorse,Mich. G5 .....4.30
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 ..4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ..4.10
LoneStar,Tex. L6 ....4.50
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14.4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.10
Youngstown R2, U5, Y1.4.10

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 .....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.25
Ecorse,Mich. G5 .....6.45
Fairfield,Ala. T2 .....6.25
Fontana,Calif.(30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ....6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ..6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14.6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 .....5.55
Coatesville,Pa. L7 ....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.55
So.Chicago,Ill. U5, W14.5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ..5.15
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 ....5.15

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..4.35
Ashland,l.c.l.(15) A10 ..4.85
Cleveland, c.l. R2 .....4.70
Warren,O. c.l. R2 .....4.70

BARS

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.35
Atlanta,Ga. A11 .....4.40
Bessemer,Ala. T2 .....4.15
Buffalo(31) R2 .....4.18
Clairton,Pa. U5 .....4.15
Cleveland(31) R2 .....4.21
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.35
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Gadsden,Ala.(31) R2 ....4.18
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 .....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 .....4.90
Seattle B3, N14 .....4.90
So.Chicago U5, W14 ....4.15
Chicago(31) R2 .....4.22
So.Duquesne,Pa. U5 ....4.15
So.SanFran.,Calif. B3 ..4.90
Sterling,Ill.(1) N15 ....4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 .....4.15
Youngstown U5 .....4.15
Youngstown(31) R2 ....4.20

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. R2, T7 .....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.075
Fairless,Pa. U5 .....5.025
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.275
Ind.Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 .....4.875
KansasCity,Mo. S5 ....5.475
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2, U5,W14 4.875
So.Duquesne,Pa. U5 ..4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.225
Bessemer,Ala. T2 .....6.225
Bethlehem,Pa. B2 .....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.425
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. Y1 ....6.725
Ind.Harb.,Ind. I-2 ....6.225
Johnstown,Pa. B2 .....6.225
Lackawanna,N.Y. B2..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ..6.225
So.SanFrancisco B3 ..6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES; H.R.CARBON
Bethlenem,Pa. B2 .....4.35

BAR SIZE ANGLES: S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.35
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....5.00
Houston S5 .....5.60
KansasCity S5 .....5.60
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12,R2 5.20
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 .....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ...5.20
Gary,Ind. R2 .....5.20
GreenBay,Wis. F7 .....5.20
Hammond,Ind. L2, M13.5.20
Hartford,Conn. R2 ....5.75
Harvey,Ill. B5 .....5.20
LosAngeles R2 .....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R2, R8 ...5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.65
NewCastle,Pa. (17) B4..5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 .....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ..6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md. (5) C19 4.45

BARS, Cold-Finishing Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 .....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2, T7 ....6.325
Carnegie,Pa. C12 .....6.325
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit R7 .....6.425
Detroit P17 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.325
Gary,Ind. R2 .....6.325
Hammond,Ind. L2,M13.6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2 ..6.325
Mansfield,Mass. B5 ...6.775
Massillon,O. R2, R8 ...6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2,W14.6.325
SpringCity,Pa. K3 .....6.50
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ...6.625
Youngstown F3, Y1 ....6.325

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..4.15
Atlanta A11 .....4.35
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.00
Seattle B3, N14 .....4.90
So.Chicago,Ill. R2 .....4.15
So.Duquesne,Pa. U5 ....4.15
So. SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling,Ill. (1) N15 ....4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Reinforcing (Fabricated; to consumers)
Johnstown, ¼-1" B2 ...5.55
KansasCity S5 .....6.35
LosAngeles B3 .....5.80
Marion,O. P11 .....5.55
Seattle N14 .....5.80
Seattle B3 .....5.85
So.SanFrancisco B3 ....5.85
SparrowsPt. ½-1" B2 ..5.55
Williamsport,Pa. S19 ..5.45

RAIL STEEL BARS
Avis,Pa.(3) J5 .....4.25
ChicagoHts.(3) C2, I-2.4.05
ChicagoHts.(4) C2, I-2..4.15
FortWorth,Tex.(26) T4..4.65
Franklin,Pa.(3) F5 ....4.05
Franklin,Pa.(4) F5 ....4.15
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.15
Tonawanda(3,4) B12 ..4.15
Williamsport,Pa.(3) S19 4.25
Williamsport,Pa.(4) S19.5.45

BARS, Wrought Iron
Economy,Pa.(S.R.)B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
McK.Rks.(S.R.) L5 ...10.40
McK.Rks.(D.R.) L5 ...14.00
McK.Rks.(Staybolt) L5.15.50

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.925
Allenport,Pa. P7 .....3.925
Ashland,Ky.(8) A10 ...3.925
Cleveland J5, R2 .....3.925
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.125
Fairfield,Ala. T2 .....3.925
Fairless,Pa. U5 .....4.025
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 .....4.025
GraniteCity,Ill. G4 ....4.125
Ind.Harbor,Ind. I-2, Y1.3.925
Irvin,Pa. U5 .....3.925

mo,Ind. C16 .....4.025
wanna,N.Y. B2 ..3.925
all,Pa. U5 .....3.925
ort,Ky. N9 .....3.925
O. N12 .....5.175
burg.Calif. C11 ...4.625
burgh J5 .....3.925
mouth,O. P12 ....3.925
dale,Ill. A1 .....3.925
n,Pa. S3 .....3.925
icago,Ill. W14 ...3.925
owsPoint,Md. B2..3.925
enville,O. W10 ...3.925
nce,Calif. C11 ...4.625
en,O. R2 .....3.925
on,W.Va. W6 ....3.925
gstown U5, Y1 ...3.925

S H. R. (19 gage)
maCity,Ala. R2..5.225
r.O. R1 .....5.05
mo,Ind. C16 .....5.025
field,O. E6 .....5.05
, O. N12 .....4.775
ance,Calif. C11 ....5.875

TS, H.R. (14 ga. heavier)
gh-Strength Low-Alloy
eland J5, R2 .....5.90
hohocken,Pa. A3 ..5.90
se,Mich. G5 .....6.10
field,Ala. T2 .....5.90
ana,Calif. K1 ....6.675
.Ind. U5 .....5.90
Harbor,Ind. I-2 ....5.90
Harbor,Ind Y1 ....6.40
,Pa. U5 .....5.90
kawanna(35) B2 ..5.90
hall,Pa. U5 .....5.90
sburgh J5 .....5.90
on,Pa. S3 .....5.90
hicago,Ill. U5 .....5.90
rrowsPoint(36) B2 ..5.90
ren,O. R2 .....5.90
rton,W.Va. W6 ....5.90
ngstown U5 .....5.90
ngstown Y1 .....6.40

ETS, Hot-Rolled Ingot Iron
8 Gage and Heavier)
land,Ky.(8) A10 ..4.175
veland R2 .....4.525
Harbor,Ind. I-2 ...4.175
rren,O. R2 .....4.525

ETS, Cold-Rolled Steel
Commercial Quality)
nport,Pa. P7 ....4.775
veland J5, R2 .....4.775
rse,Mich. G5 .....4.975
rfield, Ala. T2 ....4.775
rless,Pa. U5 .....4.875
lansbee,W.Va. F4 ..4.775
tana,Calif. K1 ....5.875
ry,Ind. U5 .....4.775
niteCity,Ill. G4 ...4.975
.Harbor,Ind. I-2,Y1.4.775
in,Pa. U5 .....4.775
kawanna,N.Y. B2 ..4.775
ddletown,O. A10 ...4.775
tsburg,Calif. C11 ...5.725
sburgh J5 .....4.775
tsmouth,O. P12 ....4.775
rrowsPoint,Md. B2..4.775
ubenville,O. W10...4.775
rren,O. R2 .....4.775
irton,W.Va. W6 ....4.775
ungstown Y1 .....4.775

ETS, Cold-Rolled
High-Strength Low Alloy
veland J5, R2 .....7.225
orse,Mich. G5 .....7.425
ntana,Calif. K1 ....8.275
ry,Ind. U5 .....7.225
lianaHarbor,Ind. Y1.7.725
in,Pa. U5 .....7.225
ckawanna(37) B2 ..7.225
tsburgh J5 .....7.225
arrowsPoint (38) B2.7.225
arren,O. R2 .....7.225
irton,W.Va. W6 ....7.225
ungstown Y1 .....7.725

EETS, Cold-Rolled Ingot Iron
veland R2 .....5.375
ddletown,O. A10 ....5.275
arren,O. R2 .....5.375

EETS, Culvert	**Cu Alloy**	**Cu FE**
shland,Ky A10	.6.325	....
nton,O. R2	....6.475	6.925
irfield T2	....6.075	6.325
ary,Ind. U5	....6.075	6.325
d.Harbor I-2	..6.075	6.325
vin,Pa. U5	....6.075	6.325
komo,Ind. C16	.6.175	....
artinsFry.,O.W10	6.075	....
tts.,Calif. C11	..6.825	....
arrowsPt. B2..	6.075	....
orrance,Cal. C11	7.075	....

EETS, Culvert	**Pure Iron**
shland,Ky. A10	....6.375
irfield,Ala. T2	.....6.325
artinsFerry,O. W10	..6.325

SHEETS, Gal'd No. 10 Steel
AlabamaCity,Ala. R2 ..5.275
Ashland,Ky.(8) A10 ...5.275
Canton,O. R2 .....5.275
Delphos,O. N16 .....5.775
Dover,O. R1 .....5.275
Fairfield,Ala. T2 ....5.275†
Gary,Ind. U5 .....5.275†
GraniteCity,Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ...5.275
Irvin,Pa. U5 .....5.275†
Kokomo,Ind. C16 ....5.375†
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....5.275
Pittsburg,Calif. C11 ..6.025†
SparrowsPoint,Md. B2..5.275
Steubenville,O. W10 ...5.275
Torrance,Calif. C11 ..6.275†
Weirton,W.Va. W6 ....5.275

†Based on 5c zinc.

SHEETS, Galvanized No. 10
High-Strength Low-Alloy
Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2..8.075

SHEETS, Galvanized Ingot Iron
No. 10 flat
Ashland.Ky.(8) A10 ...5.525
Canton,O. R2 .....6.025

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825†
Kokomo,Ind C16 ....5.925†
Niles,O. N12 .....5.825

†Based on 5c zinc

SHEETS, ZINCGRIP Steel
Bulter,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, ZINCGRIP Ingot Iron
Butler,Pa. A10 .....5.775
Middletown,O. A10 ....5.775

SHEETS, Electrogalvanized
Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED
Buiter,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland.Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ....5.375
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10....5.175
Niles,O. N12 .....6.525
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.
Follansbee,W.Va. F4 ..7.30
Follansbee(23) F4 ....7.175
Yorkville,O. W10 .....7.20

SHEETS, Long Terne Steel
(Commercial Quality)
BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ....5.675
Niles,O. N12 .....5.675
Weirton,W.Va. W6 ...5.675

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ....6.075

SHEETS, Well Casing
Fontana,Calif. K1 ....6.20

STRIP

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 ..3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ...3.925
Atlanta A11 .....4.125
Bessemer,Ala. T2 ....3.925
Bridgeport,Conn.(10)S15 3.95
Buffalo(27) R2 .....3.925
Carnegie,Pa. S18 ....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.125
Fairfield,Ala. T2 ....3.925
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.325
Ind.Harbor,Ind. I-2,Y1.3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5..4.525
Lackw'na,N.Y.(25) B2.3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ....5.025
NewBritain(10) S15 ....4.15
N.Tonawanda,N.Y. B11.3.925
Pittsburg,Calif. C11 ...4.675
Portsmouth,O. P12 ....3.925
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3 .....4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2.3.925
Torrance,Calif. C11 ...4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 ....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.80
KansasCity,Mo. S5 ....7.00
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled
High-Strength Low-Alloy
Bessemer,Ala. T2 .....5.95
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....5.95
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.70
Seattle(25) B3 .....6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25) B3.6.70
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 ....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(8) A10 ..4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon
Anderson,Ind. G5 .....5.45
Bridgeprt.Conn.(10) S15 5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....5.65
Detroit D2, M1, P20....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.65
Follansbee,W.Va. F4 ..5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill. T6 ..5.70
Ind.Harbor,Ind. I-2 ....5.70
Lackawanna,N.Y. B2 ..5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.10
Middletown,O. A10 ....5.45
NewBedford,Mass. R10..6.00
NewBritain(10) S15 ...5.75
NewCastle,Pa. B4, E5..5.45
NewHaven,Conn. A7 ...6.20
NewHaven,Conn. D2 ....5.90
Pawtucket,R.I. N8, R3..6.10
Pittsburgh J5 .....5.45
Riverdale,Ill. A1 .....5.70
Rome,N.Y.(29) R6 ....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ....5.90
Warren,O.(40) T5 .....5.45
Warren,O. B9, R2 .....5.45
Weirton,W.Va. W6 ....5.45
Worcester,Mass. W19 ...7.05
Worcester,Mass. A7 ....6.30
Youngstown C8 .....5.95
Youngstown Y1 .....5.45

STRIP, Cold-Rolled Alloy Steel
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
Pawtucket,R.I.(11) N8 12.15
Pawtucket,R.I.(12) N8 12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ...12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.35
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J5 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.05

STRIP, Electrogalvanized
Dover,O. G6 .....5.45
Warren,O. B9, T5 .....5.45
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.70

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American CladmetalsCo.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div.
H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 ElectroMetallurgicalCo.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod. Steel Strip Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible SteelCo.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) S15	5.45	7.65	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.55	....
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich. D3	5.65	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.45	10.55	....
Dover,O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark,Ill. T6	5.70	7.80	8.75	10.70	13.00
Harrison,N.J. C18	...	...	8.90	10.85	13.15
Mattapan,Mass. T6	6.10	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15.	5.75	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	....	....
NewCastle,Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	5.90	7.95	8.55	10.65	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket,R.I.(11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I. (12) N8	6.10	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	...	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	5.90	7.95	8.90	10.85	13.15
Warren,O. T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass. A7	6.30	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.10	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Buffalo W12	...	...	12.50	....	....
Bristol,Conn. W1	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass W12	...	...	12.50	....	....
Youngstown C8	...	...	12.50	15.00	18.00

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	...	8.75	9.75	10.65
Brackenridge,Pa. A4	...	...	8.75	9.75	10.65
IndianaHarbor,Ind. I-2	7.85	8.15	8.75	9.75	....
Mansfield,O. E6	7.85	8.15	8.75	9.75	10.65
Newport,Ky. N9	7.85	8.15	8.75	9.75	10.65
Niles,O. N12	7.85	8.15	8.75	9.75	....
Vandergrift,Pa. U5	...	8.15	8.75	9.75	10.65
Warren,O. R2	7.85	8.15	8.75	9.75	....
Zanesville,O. A10	...	8.15	8.75	9.75	10.65

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semi processed ½c lower)	Field	Armature	Electric	Motor	Dynamo
GraniteCity,Ill. G4	8.25*	8.60*	9.20*	10.20*	....
IndianaHarbor,Ind. I-2	8.05	8.40*	9.00*	....	....
Vandergrift,Pa. U5	8.05*	8.90	9.50	10.50	11.40
Warren,O. R2	8.05†	8.90	9.50	10.50	11.40

H.R SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.60	12.15	12.65	13.65
Brackenridge,Pa. A4	11.60	....	....	....
Newport,Ky. N9	11.60	....	....	....
Vandergrift,Pa. U5	11.60	12.15	12.65	13.65
Zanesville,O. A10	11.60	12.15	12.65	13.65

C.R. COILS & CUT LENTGHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.25	16.75	....
Vandergrift,Pa. U5	13.65	14.65	16.25	16.75	12.35‡
Warren,O. R2	....	....	....	....	12.35‡

*Semiprocessed. †Fully processed only. ‡Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va.W6	8.70	8.95
Yorkville,O. W10.	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville, O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.725
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Jacksonville,Fla. M8	6.05
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2.	5.625
Sterling,Ill.(1) N15	5.525
Struthers,O. Y1	5.525
Waukegan,Ill A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
LosAngeles B3	7.875
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.175
Monessen,Pa. P7, P16	6.925
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
RoeblingN.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt., Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.80
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2.	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving(8"Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.30
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7,T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Buffalo W12	9.50
Johnstown,Pa. B2	9.50
Minnequa,Colo. C10	9.625
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.55
Roebling,N.J. R5	12.85

WIRE,Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P7, P16	7.45
Pawtkt.,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12.	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld.	Galv.
Ala.City R2	6.675	7.075**
Aliquippa J5	6.675	7.20*
Atlanta A11	6.775	7.30
Bartonville(48)K4	6.775	7.275
Buffalo W12	6.675	7.075†
Cleveland A7	6.675	....
Crawfordsville M8	6.775	7.30
Donora,Pa. A7	6.675	7.075†
Duluth,Minn. A7	6.675	7.075†
Fairfield T2	6.675	7.075†
Houston,Tex. S5	7.075	7.475
Jacksonville,Fla. M8	7.20	7.73
JohnstownB2(48)	6.675	7.225*
Joliet,Ill. A7	6.675	7.075†
KansasCity,Mo.S5	7.275	7.675
Kokomo C16	6.775	7.175†
LosAngeles B3	7.625	....
Minnequa C10	6.925	7.325**
Monessen P7(48)	6.675	7.225
Palmer W12	6.975	7.375†
Pitts.,Calif. C11	7.625	8.025†
Portsmouth,O.P12	6.675	....
Rankin A7	6.675	7.075†
So.Chi'go R2	6.675	7.075**
S.S.Frn.(48)C10	7.625	8.025**
Spar'wsPt.B2(48)	6.775	7.325*
Sterl'g(1)(48)N15	6.675	7.175
Struthers,O. Y1	6.675	7.175
Worcester A7	6.975	....

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga.	Col.
Ala.City,Ala. R2	140**
Ala.City, 17 ga. R2	235**
Ala.City 18 ga. R2	245**
Aliq'ppa,Pa.9-14½ga. J5	143*
Atlanta A11	145
Bartonville,Ill. K4	*144*
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga.,6"B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142†
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	142

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8.	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

WIRE, Barbed	Col.
AlabamaCity R2	153**
AliquippaJ5	150*
Atlanta A11	158
Bartonville,Ill. K4	*157*
Crawfordsville,Ind. M8	158
Donora,Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156*
Joliet,Ill. A7	153†
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155†
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153**
S.SanFrancisco C10	176**
SparrowsPoint,Md. B2.	158*
Sterling,Ill. (1) N15	155

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

	An'ld. Galv. Stone	Stone
WIRE, (16gage)		
Ala.City R2	12.50	14.05**
Aliquippa J5	12.50	14.30*
Bartonville K4	12.60	14.35
Buffalo W12	12.50	....
Cleveland A7	12.50	....
CrawfordsvilleM8	12.50	14.30
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35*
Kokomo C16	12.60	14.15†
Minnequa C10	12.75	14.45**
Palmer.Mas.W12	12.50	14.05†
Pitts.,Calif. C11	12.85	14.40†
SparrowsPt. B2	12.60	14.45*
Sterling(1) N15	12.50	14.25
Waukegan A7	12.50	14.05†
Worcester A7	12.80	....

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	131
Atlanta A11	133
Bartonville,Ill. K4	133
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	150
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt., Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, CUT (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	133
Aliquippa,Pa. J5	133
Atlanta A11	135
Bartonville,Ill. K4	135
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	152
Rankin,Pa. A7	133
So.Chicago,Ill. R2	133
SparrowsPt., Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	145
Duluth,Minn. A7 (49)	145
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	145
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	145
Williamsport,Pa. S19	*148*

MLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

—Inches	2		2½		3		3½		4		5		6	
Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
ds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
uippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
ridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
n, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
gstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

CTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

gstown R2 (**)	15.75	1.5	19.75	3.5	22.25	6.0	23.75	7.5	23.75	7.5	23	7.5	25.5	6.75

TWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
ds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
uippa, Pa. J5 (‡)	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
n, Ill. L1 (§)	...	...	....	...	....	....	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
wood, W. Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
er, Pa. F6 (†)	26.5	+1.75	19.5	+2.75	12.5	+6.25	....	..	....	..	....	....	....	....	....	....
a, Pa. N2 (†)	...	...	....	...	....	....	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
less, Pa. N3	...	...	....	...	....	....	24.25	..	27.25	..	29.75	...	32.25	....	32.75	....
tana, Calif. K1 (§)	...	...	....	...	....	....	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Harbor Y1 (††)	...	...	....	...	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
ain, O. N3 (*)	...	...	....	...	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
ron, Pa. S4 (‡)	26.5	—0.25	19.50	+4.25	12.5	+8.5	....	..	....	..	....	....	....	....	....	....
ron, Pa. M6	...	...	....	...	....	....	26.25	12	29.25	16	31.75	19.5	34.25	20	34.75	21
rrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
ungstown R2 (**)	...	...	....	...	....	....	26.25	12	29.25	16	31.75	19.5	34.25	20.0	34.75	21.0
ungstown Y1 (††)	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
eatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

—Inches	2		2½		3		3½		4	
Per Ft	37c		58.5c		76.5c		92c		$1.09	
nds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
quippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....
on, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	....	....	....
wood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
ia, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
rless, Pa. N3	33.25	....	34.75	....	34.75	....	25.75	....	25.75	....
ntana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	....	....	....	....
Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
rain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
aron, Pa. M6	35.25	21.5	36.75	21	36.75	21	....	....	....	....
rrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
ungstown R2 (**)	35.25	21.5	36.75	21.0	36.75	21.0	27.75	11.5	27.75	11.5
ungstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
eatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; ($), 10c to under 11c; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment.

OILER TUBES

t base c.l. prices, dollar per 100 ft, mill; minimum ill thickness, cut lengths 10 to 24 ft, inclusive.

D.	B.W.	—Seamless—		Elec. Weld
n	Gage	H.R.	C.D.	H.R.
	13	....	19.02	18.44
¼	13	....	22.53	18.12
½	13	20.65	24.91	20.01
¾	13	24.40	29.43	23.66
	13	27.34	32.98	26.51
¼	13	30.80	37.16	29.86
½	12	33.43	40.32	32.41
¾	12	36.82	44.41	35.70
	12	39.87	48.09	38.66
¼	12	42.52	51.28	41.23

AILWAY MATERIALS

AILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
essemer,Pa. U5	4.325	4.225	4.275	5.20
nsley,Ala. T2	4.325	4.225	....	5.20
airfield,Ala. T2	....	....	....	5.20
ary,Ind. U5	4.325	4.225	4.275	...
untington,W.Va. W7	....	....	....	5.20
diana Harbor,Ind. I-2	4.325	4.225	4.275	...
ohnstown,Pa. B2	....	....	...(16)	5.20
ackawanna,N.Y. B2	4.325	4.225	....	5.20
linnequa,Colo. C10	4.325	4.125	....	5.70
teelton,Pa. B2	4.325	4.225	....	...
Williamsport,Pa. S19	....	....	....	5.20

IE PLATES

Fairfield,Ala. T2	5.125
Gary,Ind. U5	5.125
Ind.Harbor,Ind. I-2	5.125
ackawanna,N.Y. B2	5.125
Minnequa,Colo. C10	5.125
Pittsburg,Calif. C11	5.275
Seattle B3	5.275
Steelton,Pa. B2	5.125
Torrance,Calif. C11	5.275

TRACK BOLTS (20) Treated

Cleveland R2	11.00
KansasCity, Mo. S5	11.00
Lebanon,Pa. B2	11.00
Minnequa,Colo. C10	11.00
Pittsburgh O3, P14	11.00

JOINT BARS

Bessemer,Pa. U5	5.275
Fairfield,Ala. T2	5.275
Ind.Harbor,Ind. I-2	5.275
Joliet,Ill. U5	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Steelton,Pa. B2	5.275

AXLES

Ind.Harbor,Ind. S13	6.50
Johnstown,Pa. B2	6.50

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	7.05
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.05
Minnequa,Colo. C10	7.05
Pittsburgh J5	7.05
Seattle B3	7.55
So.Chicago,Ill. R2	7.05
Struthers,O. Y1	7.05
Youngstown R2	7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 8.90c
⅞-in. under ....26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in. & ⅝-in.	5
¾-in. and larger	3
Longer than 6 in.:	
All diams.	+4
Lag bolts, all diams.:	
6 in. and shorter	12
Over 6 in. long.	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. & C.P., regular & heavy:	
Square, all sizes	58
H.P., Hex, regular & heavy:	
¾" and smaller	58
⅞" to 1⅛", inclusive	60
1¼" to 1½", inclusive	62
1⅝" and larger	58
C.P. Hex, regular heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
¾" and smaller	40
⅞" to 1½", inclusive	43
Finished Hex Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex.:	
Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼-in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5 & 10
Plated finishes	30 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.55c; 1 15/16" to 1 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c for H.S.-L.A.
(31) Base; deld. within mill county.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6-7 gage.
(49) T-post; deduct 2 cols for U-post.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.i.f. N.Y., c.l., in bags	11.25
Electrolytic iron:	
Annealed, 99.5% Fe.	42.50
Unannealed (99+% Fe)	36.50
Unannealed (99+% Fe) (minus 325 mesh)	53.50
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb drums, freight allowed:	
Carlots	31.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, 20-ton lots	29.25-36.50
Bronze, 10-ton lots	51.00-60.00
Copper:	
Electrolytic	13.50*
Reduced	13.50*
Lead	7.50*
Magnesium	75.00-85.00
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel unannealed	89.50
Nickel-Silver 5-ton lots	47.00
Silicon	43.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.00*
Zinc, 10-ton lots	17.50-25.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh: 1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.9% Cr min.	3.60

*Plus cost of metal.

STAINLESS STEEL MILL PRICES

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R & C.F. H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	54.25	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
316L	....	....	52.50	....	....	61.00	64.25	70.00	72.00
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	53.00	39.50	40.75	59.75	71.00
501	....	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Shenango Agaloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.30	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	....	.....	46.00	....

*Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25	5% Cr Hot Work	0.39
Extra Carbon	0.30	W-Cr Hot Work	0.41
Special Carbon	0.355	V-Cr Hot Work	0.42-.43
Oil Hardening	0.37-.390	Hi-Carbon-Cr.	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	3.875
18.25	4.25	1	4.75	...	2.160-2.320
18	4	2	9	...	2.515
18	4	2	....	...	1.640
18	4	1	....	...	1.480
13.5	4	3	....	...	1.735
6.4	4.5	1.9	....	5	1.005-1.055
6	4	3	....	6	1.240
2	1.4	1.2	....	...	0.495
1.5	4	1	....	8.5	0.865-0.895

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, deld.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	.....
Boston, deld.	66.65	67.15	67.65	....
Rochester,N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon,Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., deld. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
Nevillelsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, deld	57.37	57.87	57.87	58.37
McKeesRocks, deld.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wimerding,Monaco, deld.	57.66	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U6	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	62.50	63.00	63.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos. southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

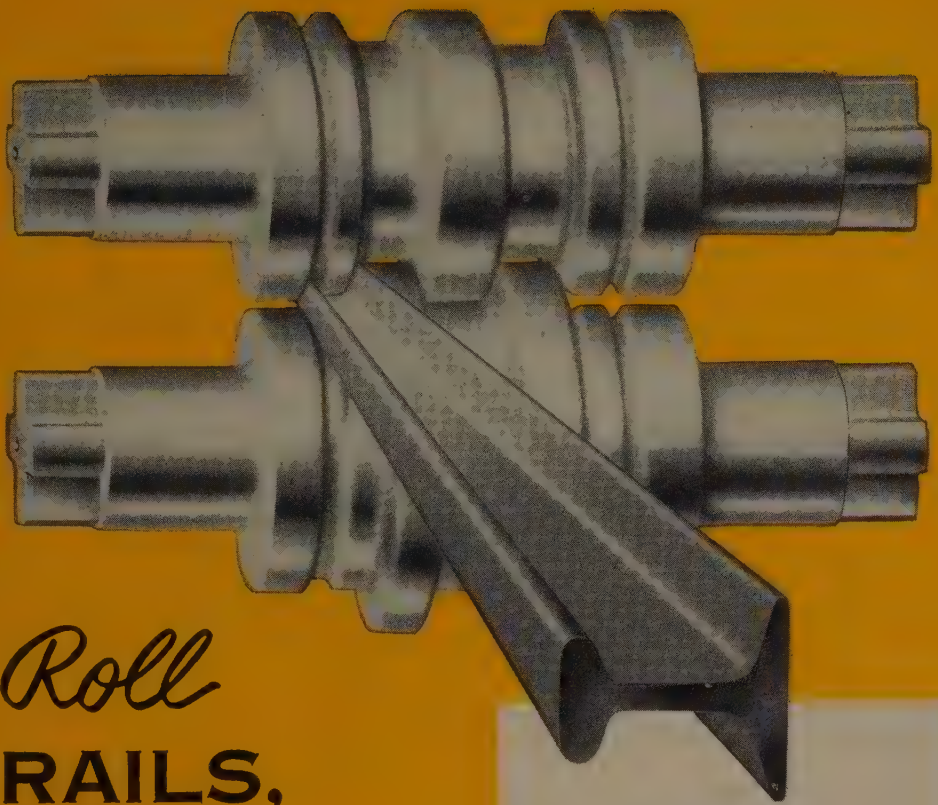
ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frt, allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.55
Troy,N.Y. R2	64.00



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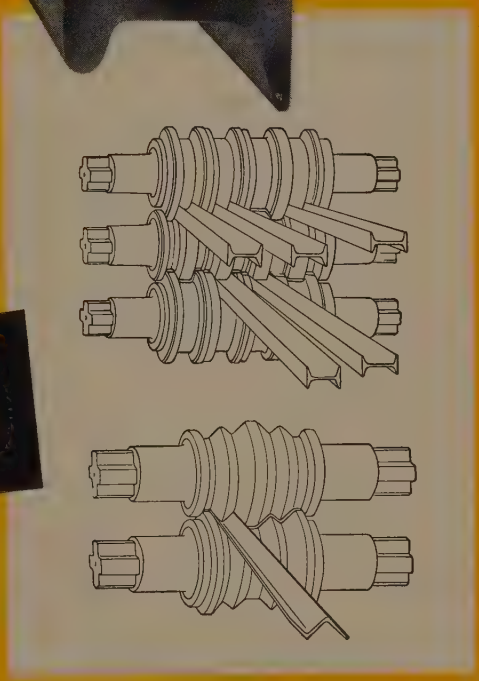


for Accurate Forming at Minimum Cost

THE NATIONAL ROLL & FOUNDRY CO.

Avonmore, Pennsylvania

SPECIALISTS IN IRON, ALLOY IRON AND STEEL ROLLS AND CASTINGS
STEEL ARMOR CASTINGS

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Erie, Cincinnati, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	6.20	7.12	7.78	7.00	...	6.86	8.17[6]	12.04	6.98	6.85	7.96
Birmingham	6.10	7.00	8.00[2]	6.30	...	6.15	8.90	....	6.35	6.35	8.25
Boston	6.89	7.83	9.18	7.13	...	6.87	8.35	12.28	7.06	7.13	8.26
Buffalo	6.18	7.15	8.96	6.79	...	6.35	7.70	12.17	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	8.00	6.42	...	6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.42	6.72	...	6.58	7.66	12.17	6.93	6.80	7.88
Cleveland	6.18	7.12	7.90	6.58	...	6.34	7.40	11.89	6.79	6.50	7.79
Detroit	6.38	7.31	8.27	6.71	7.36	6.56	7.60	12.12	6.93	6.80	7.80
Erie, Pa.	6.13	...	8.15	6.38	...	6.23	7.50[6]	....	6.50	6.36	7.79
Houston	7.15	7.60	9.40	7.45	9.30	7.45	9.30	....	7.35	7.20	8.56
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.17	6.59	...	6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.35	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.48	7.45	8.37	6.82	...	7.06	8.43[6]	11.84	6.60	6.99	8.01
Norfolk, Va.	6.90	...	...	7.20	...	7.20	8.50	....	7.20	7.15	7.85
Philadelphia	6.35	7.13	7.90	7.02	8.80	6.87	8.19[6]	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.00	6.55	...	6.28	7.65	11.89	6.46	6.33	7.46
Portland, Oreg.	7.90	8.45	9.15	7.65	...	7.35	10.65	....	7.25	7.30	9.15
Richmond, Va.	6.50	7.45	8.00	7.10	...	7.05	7.95	....	7.10	6.85	8.10
St. Louis	6.48	7.42	8.30	6.72	...	6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.84	7.78	8.66	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	10.15	7.60	...	7.15	9.75	13.05	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	8.00	...	7.60	10.65	13.50	7.50	7.60	9.40
Spokane	8.15	9.40[7]	9.80	7.60	...	7.60	10.55[8]	14.15	7.25	7.35	9.40
Washington	6.71	8.15	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; [2]—500 to 9999 lb; [6]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.

Warehouse Steel Sales Gain Slightly

Improvement in volume of business is due primarily to diversified buying of standard carbon products and increased interest in specialties

Chicago — Warehouses sense a quickening in inquiries which they would like to interpret as a rising business level. They admit freely, however, that it may be only wishful thinking since no consuming classification is unmistakably heading upward. March sales are expected to exceed February's by a narrow margin.

Boston — Increase in warehouse sales recently is due to a mild gain in the number of small, diversified orders. This diversification is reflected slightly in better demand for specialties. Distributors, in some cases, while seeking to maintain balance, are trying to lower their overall inventories, notably in carbon bars. Only a few months back lack of inventory was the major problem of sellers.

Cleveland—Some quickening in orders is expected this month by district warehouses, especially in building steel products. With manufacturing consumers still working off inventories with operations curtailed, individual orders of a fill-in nature are fairly numerous. Distributors' inventories are well balanced, and, overall, are in the best shape in many months.

Philadelphia—Warehouse business is picking up slowly. February volume showed definite improvement over January. Most distributors think the trend will be sustained this month. Buying is predominantly for cut pieces. Orders are small but more numerous.

New York—Slight improvement in warehouse demand is due to diversified buying of standard carbon products. Alloys and specialties lag. Orders are small individually, but numerous. Higher nickel stainless sales are increasing, mostly at expense of straight chromium grades. Galvanized sheets have been reduced $1 per ton reflecting lower zinc costs.

Pittsburgh—Distributors think they reached the low point of the first half in February. March sales are spotty. Scattered improvement in or-

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$4.75	$4.85	$4.75	$5.00
Bar Size Angles	4.39	4.49	4.39	4.67
Structural Angles	4.39	4.49	4.39	4.67
I-Beams	4.39	4.49	4.39	4.67
Wide Flange Beams	4.94	5.02	4.94	5.22
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.87	5.95	5.87	6.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.00	25.70	25.50	26.34
Barbed Wire	6.20	6.30	6.20	6.48
Merchant Bars	4.65	4.75	4.65	4.93
Hot Rolled Bands	4.65	4.75	4.65	4.93
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Channels	4.49	4.59	4.49	4.77
Bright Common Wire Nails, 8d	6.55	6.65	6.60	6.85

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

is offset by slower industrial op-ions. Stocks are complete. Ware-ses are doing little buying of slow-ing products.

Cincinnati—The anticipated pickup usiness in last half of February not materialize. Better demand is ected in March, particularly in ding lines.

Los Angeles—Warehousemen are imistic that the slight upward nd in activity that started in De-ber will become more noticeable March.

Seattle—Local warehouses were amped with rush orders following tlement of a 6-week strike of union rkers at metalworking shops. The rehouse trade here is reported ex-ding. Inventories are satisfactory. cal prices are firm but Portland, eg., dealers are still confronted th an unsettled market.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 201

Chicago—Foundry coke suppliers lieve March shipments will exceed ose in both January and February. general, inventories were allowed get pretty low. Bigger intake and mewhat higher melting rate are ought to be ahead.

Structural Shapes . . .

Structural Shape Prices, Page 178

Boston—Fabricating shops are well ocked with standard structurals d the mills are making progress in dancing wide flange sections. reight absorption to equalize on bar apes is imminent. District shops re making inroads on backlogs, but ost have close to three months ork ahead. Competition sharpens n both contractor-placed volume and rect bid steel in place.

New York—Structural awards are otty, but inquiry is a shade livelier, cluding several schools, with a $3,-00,000 high school in Garden City, ong Island, outstanding. Three ublic schools are also up for bids t East Meadow, Long Island, and high school at Hicksville, Long sland.

Philadelphia—Structural activity is otty. Estimating departments are ore active, but contracting is light. Most larger shops have good back-ogs but can work in tonnage for airly early delivery. Smaller shops re competing sharply on projects within their size range.

Seattle—An increasing volume of small jobs is reported. Fabricating plants are booking more orders in less than 100-ton lots. School and commercial projects are numerous, involving small tonnages of structurals.

Steel Shipments Record Set in 1953

Tonnage movement up 17.9 per cent from 1952 to new peak. Shipment gain to consumer durable goods largest, led by automotive. Warehouses continue as chief market outlet

New York—Finished steel shipments set a new record in 1953 at 80,151,893 net tons, reports the American Iron & Steel Institute.

Up more than 12.1 million tons, or 17.9 per cent, over the preceding year, the heavier movement reflected enlarged producing facilities, absence of industry-wide steel strikes, and heavy demand through the first three quarters of the year.

Specific shipment data by product and market classification are shown in the accompanying tabulations.

Consumer durable goods demand gained most. But the warehouses, for the third successive year, held first rank in the list of market outlets for the products of the mills. The warehouse take was 14,878,859 net tons, 19.2 per cent of total shipments, setting a new record, and topping the 1952 take by more than 1.5 million tons.

Shipments to the automotive industry amounted to nearly 14.7 million tons, or 18.9 per cent of the total movement, and more than 3.8 million tons above the industry's take in 1952. The increase was the largest in tons reported for any market classification.

The electrical machinery and construction markets also were up, both tonnage-wise and percentage-wise over 1952. Direct shipments for construction exceeded 9.9 million tons, while more than 3.3 million tons went to manufacturers of such construction uses as plumbing, hardware and airconditioning. This made a record high construction total of 13.2 million tons, 27 per cent above that in the preceding year.

Large shipment declines were reported for exports, shipbuilding and agricultural markets. The decline in exports was attributable to increased foreign competition. Those for shipbuilding and agriculture reflect slackened activity.

Important changes in the industry's product mix are noted. Cold-rolled sheets showed the largest increase, rising more than 3.2 million tons to nearly 11.3 million. Hot-rolled sheets, enameling sheets and electrical sheets were also up, their total of 8.8 million tons being nearly 2 million above that for 1952. Shipments of wire products, nails, fence, etc., but particularly wire products normally going to agricultural markets, showed a decrease compared with the preceding year.

Other products experiencing above average increases were: Structural shapes and piling, up 1 million tons

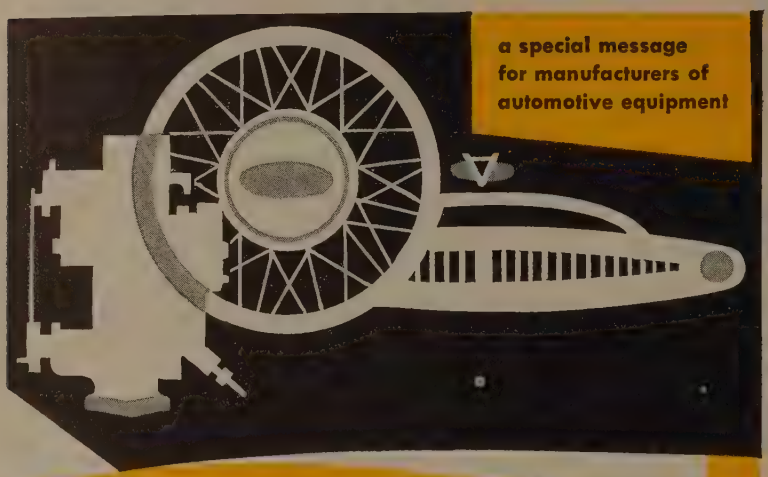
(*Please Turn to Page* 192)

Finished Steel Shipments by Market Classifications

(ALL GRADES)
(Net Tons)

Market Classification	Year 1953 Tons	Year 1953 % Total	Year 1952 Tons	Year 1952 % Total	Change From 1952 Tons	Change From 1952 %
Steel for Conv. & Processing..	3,513,976	4.5	3,037,146	4.7	476,830	15.7
Forgings (Other than Auto.)..	1,444,839	1.9	1,434,157	2.2	10,682	0.7
Bolts, nuts, rivets & screws..	1,341,606	1.7	1,297,486	2.0	44,120	3.4
Warehouses	14,878,859	19.2	13,328,642	20.6	1,550,217	11.6
Construction, Incl. Maint.	9,918,203	12.8	7,800,676	12.0	2,117,527	27.1
Contractors' Products	3,324,218	4.3	2,612,071	4.0	712,147	27.3
Automotive	14,663,775	18.9	10,850,797	16.7	3,812,978	35.1
Rail Transportation	4,787,830	6.2	3,986,029	6.2	801,801	20.1
Shipbuilding & Marine Equip..	872,209	1.1	1,028,554	1.6	156,345*	15.2*
Aircraft	161,043	0.2	136,337	0.2	24,706	18.1
Oil and Gas Drilling	755,714	1.0	768,208	1.2	12,494*	1.6*
Mining, Quarrying & Lbring...	324,380	0.4	309,628	0.5	14,752	4.8
Agriculture	1,233,247	1.6	1,347,042	2.1	113,795*	8.4*
Mchy., Ind. Equip. & Tools...	4,328,604	5.6	3,795,596	5.9	533,008	14.0
Elec. Mchy. & Equip.	2,111,879	2.7	1,609,461	2.5	502,418	31.2
App., Utensils & Cutlery	2,045,749	2.7	1,359,227	2.1	686,522	50.5
Other Domestic & Com'l. Equip.	2,086,076	2.7	1,562,458	2.4	523,618	33.5
Containers	6,051,214	7.8	5,550,625	8.6	500,589	9.0
Ordnance & Other Military....	2,690,888	3.5	2,095,593	3.2	595,295	28.4
Shipments of Non-Reporting Companies	937,853	1.2	822,679	1.3	115,174	14.0
Total Domestic	77,472,162	100.0	64,732,412	100.0	12,739,750	19.
Export	2,679,731	...	3,271,200	...	591,469*	18.1*
TOTAL SHIPMENTS	80,151,893	...	68,003,612	...	12,148,281	17.9

*Decline



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WEST COAST LICENSEE: L. H. Butcher Co.

Sheets, Strip . . .

Sheet and Strip Prices, Page 178 & 179

Cleveland—Cautious buying continues in the sheet and strip markets. While order volume is described by some sellers as fair, demand is largely on an early shipment basis—that is tonnage is being placed from month to month with supply conditions such as to assure deliveries when material is required. Consumer inventories are still being worked off but stocks in most instances are believed down to the point where replacement buying is likely to develop. Automotive demand is disappointing, although two large builders are taking tonnage in good volume.

Boston — Slight improvement in flat-rolled demand continues but increased volume is hardly sufficient to establish a definite turn in the trend for early second quarter. Galvanized sheets excepted, there will be no carryover. More consumers are shaking down inventories to a 30-day basis, taking in carbon sheets and strip two to three weeks after placement of orders.

Flat-rolled consumers haggle more over prices. Their carbon sheet costs average out $3 to $3.50 per ton lower than in third quarter last year through equalization of freight or revised extras. Low carbon cold-rolled strip ranges up to $12 lower. New rail freights next month will reduce steel costs further.

New York—Some sheet sellers report improvement. Others say business is scarcely holding its own. All agree trading is sluggish. In certain lines there seems to be a mild overall gain—cold rolled sheets, the type of electrical sheets required for fractional horsepower motors and nickel chrome stainless sheets and strip. One seller of stainless reports a definite gain in strip. Others say stainless sheets have taken a turn for the better. Demand for galvanized sheets hasn't shown much improvement recently.

Philadelphia—Sheet consumers can obtain deliveries on hot-rolled, cold-rolled and galvanized sheets within three weeks, in some cases even more quickly. Certain specialties also can be obtained promptly. Demand had expanded a trifle. Sellers are confident of more business this month than in either of the preceding two months.

Pittsburgh — Cold-rolled sheet orders show slight improvement for this month and early second quarter. Purchasing of the hot-rolled sheets is under consumption. Fabricators ex-

FAMOUS LAST WORDS:

Let's face it—they won't send out advance warning notices of atom-bomb attacks. They just sneak over and let go when we're least expecting it—without even so much as a declaration of war. The emergency may be an atom bomb or it may be a fire, a flood, a hurricane. It's only good business to be ready for it—whatever it is. Take these precautions TODAY:

- ☐ **Enlist the help** of your local Civil Defense Director.
- ☐ **Check contents** and locations of first-aid kits.
- ☐ **Send staff** to Red Cross courses. They may save your life.
- ☐ **Promote preparedness** in your community. Your local CD Director can show you how.

Set the standard of preparedness in your plant city—check off these four simple points NOW.

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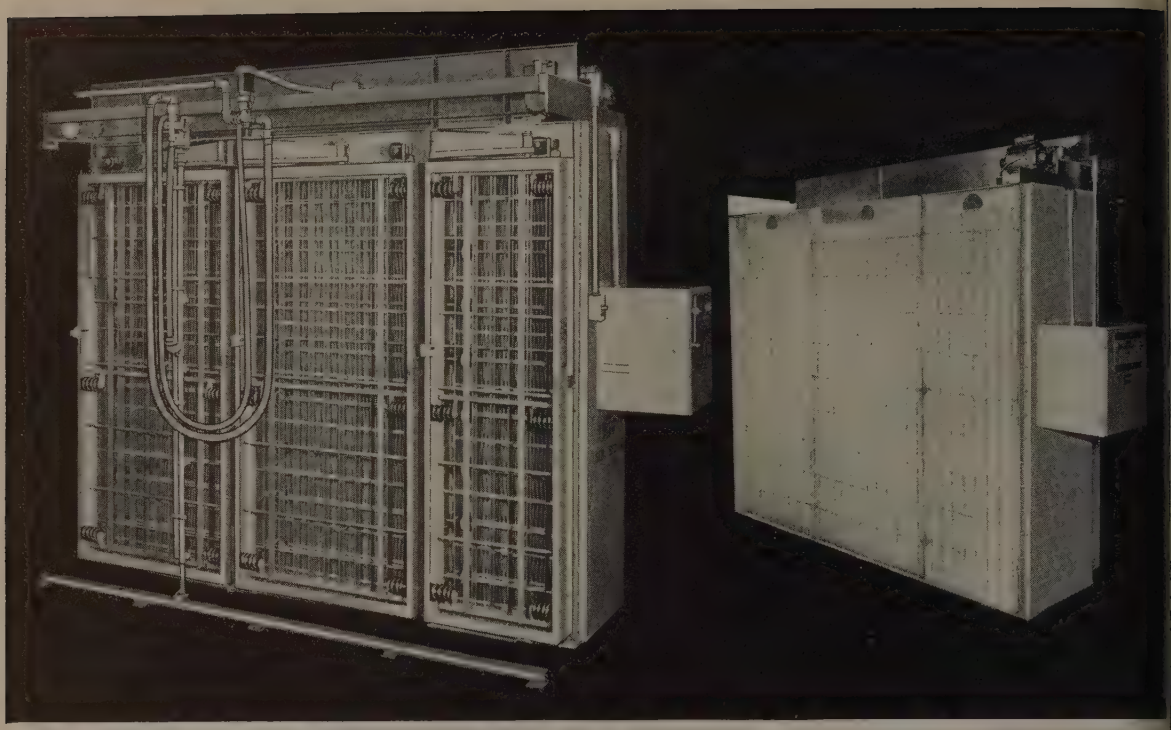

New Type "H" Washer incorporated as an integral part of the Electro-Cell precipitator. Spray nozzles for both the washing and collector plate coating operations travel on an overhead trackway. RIGHT: Rear view of Electro-Cell showing water eliminators consisting of Amer-glas pads which catch any surplus spray escaping plates during washing operation.

PUSH-BUTTON MAINTENANCE IS HERE!

AAF Electro-Cell Precipitator with Type "H" Washer cleans both the air *and itself* automatically

Clean air around the clock for mill motors, switch gear and rectifier room ventilation! Dust, soot and even smoke are "easy pickin's" for the high efficiency AAF Electro-Cell electronic precipitator. Now, with the addition of the new Type "H" Washer, that periodic cleaning operation (so essential to continued efficiency) is reduced to a mere push of a button.

Easy? Let's push the button and see what happens. First, the spray header moves back and forth across the face of the plate cells, washing away the accumulated dust and dirt. After a five-minute drying period, an adhesive coating is then applied to the clean collector plates through another set of spray nozzles mounted on the traveling header. Each operation is automatically timed. There's no opening and closing of valves or clock watching on your part. That one press of the button did the complete cleaning job.

It's a thorough job, too, because the spray heads are automatically adjusted to always point at a 5-degree angle in the direction they are traveling. Each side of each individual plate receives a thorough washing and even application of adhesive over its entire depth.

A high efficiency precipitator with a dependable, always available maintenance crew "built-in"—that's the AAF Electro-Cell with Type "H" Washer. For complete product information, call your local AAF representative or write direct.

AAF

American Air Filter

COMPANY, INC.

443 Central Avenue, Louisville 8, Kentucky

American Air Filter of Canada, Ltd., Montreal, P. Q.

d a greater pickup in orders this h and are living off inventories.

ncinnati—Little change is noted e sheet market. Larger mills con- to run at fairly high levels, e small producers lag.

. Louis—Sheet orders in Febru- were moderately up from Jan- , while shipments, because of finished and semi-finished inven- s at mills, were perhaps 20 per higher. Shipments in the dis- are expected to be fair in ch but the order outlook that th is not so good. Space is still lable in March and April rolling dules.

os Angeles—Bookings of cold- ed strip mills are down 30 per compared with fourth quarter year, and no sign of an upturn oted.

eel Bars . . .

Bar Prices, Page 178

New York—Hot carbon bar in- ry is a shade better. Nearby iveries are available on most all es. Producers can work in ton- e for March and won't have ough busines to tax operations. ril volume is developing slowly, be- se most consumers feel they can . shipments in time to meet re- rements. Most consumers are buy- on a current basis, with little position to build inventories. This an improvement over what it has en, when buyers were operating stly on inventories. Apparently, ventory reductions have about run eir course.

Cold drawers can make much bet- deliveries than a few months ago. ey now find hot stock supplies adily available. They can make de- eries this month on a fair range sizes.

Demand for rail steel merchant rs continues to lag. One seller says doesn't recall when angles were oving so slowly. Another, tied in osely with the furniture trade, re- rts business dull. One rail steel ar mill reports sign post busi- ss is good; and as far as reinforc- g bar activity is concerned with e rail steel people, this seems to undergoing seasonal improvement.

Sweets Steel Co., Williamsport, Pa., educed rail steel merchant bars from 50c to 4.25c and fence posts from 158 a ton to $148.

Philadelphia — Some buoyancy is oted in carbon bar demand. Busi- ess is not brisk, but volume is a hade better. This applies to cold- rawn as well as hot-rolled bars. onverters report renewed buying by

(*Please Turn to Page* 192)

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Than Nuts Produced By Other Methods.

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You don't guess! You don't worry when you order *"Fischer Turned"* Brass Nuts. Your order arrives on or before the promised delivery date. So Specify and Order *"Fischer Turned"* Brass Nuts . . . get *Precision, Price* and *Positive Delivery*!

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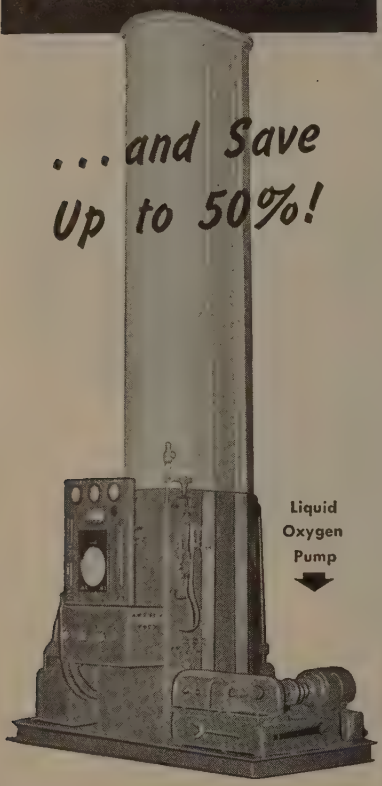

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Steel Bars . . .

(*Concluded from Page* 189)

warehouses that have been out of the market for weeks. Distributors are finding it necessary to round out stocks.

Boston — Steel bar bookings, notably cold-finished carbon, are not sufficient to maintain current reduced rolling schedules. Contributing also is the larger range of sizes and grades now available from stock. Slack in buying is attributed largely to inventories.

Tapering in consumption since the year started has not been enough to match the decline in buying, eliminating defense requirements. Consumption is off from earlier peaks, but consumer operations have held up to a point indicating users pushed up inventories well in excess of general estimates.

Pittsburgh—Seasonal improvement in sales to agricultural implement producers is beginning slowly. Demand has increased about 10 per cent from last month. Several small fabricators have worked off inventories and are ordering again. Wrought iron bar sales are slightly improved.

Cleveland—With bars available for relatively prompt shipment consumers are not ordering far ahead. Second quarter bookings are disappointing to date, especially on automotive account. Stocks in the hands of consumers and warehouses are still being worked off.

Cincinnati—Business continues fair in alloy bars but carbon bar sellers find demand slow.

Chicago—Farm machinery continues the sole bright spot in the steel bar market picture, and it isn't too impressive yet. Mill books are far from filled, both near term and for the future.

A Record for Steel

(*Concluded from Page* 185)

to 5.4 million; standard rails and track materials, up 600,000 tons to 2.5 million; oil country goods and line pipe, up 1 million tons to 5.5 million. Tin plate and strip showed increases of 13 and 23 per cent, respectively.

Semifinished Steel . . .

Semifinished Prices, Page 178

Philadelphia—Buying is edging upward, but ingot production continues to decline. This mixed trend is ascribed to the fact incoming tonnage has not caught up with production, and fourth quarter deferments have been virtually worked off. Also, the mills have cut down on building semifinished stocks.

When a balance will be struck and

Shipments of Finished Steel by Products and Grades—1953

(Net Tons)

Product	Year 1953 Carbon	Alloy	Stainless	Total
Ingots	656,623	237,877	24,089	918,589
Blooms, etc.	2,059,246	546,724	19,182	2,625,152
Skelp	113,397	.....	.....	113,397
Wire rods	774,575	19,762	6,311	800,648
Shapes	4,964,002	57,675	335	5,022,012
Piling	342,818	76	.....	342,894
Plates	7,221,343	417,783	29,148	7,668,274
Rails, standard	1,866,366	180	.....	1,866,546
Rails, other	87,445	65	.....	87,510
Joint bars	121,102	.....	.....	121,102
Tie plates	425,945	.....	.....	425,945
Track spikes	120,409	.....	.....	120,409
Wheels	331,504	741	.....	332,245
Axles	153,644	566	.....	154,210
Bars—HR	7,039,776	2,239,225	44,428	9,323,429
Bars—reinforcing	1,848,851	.....	.....	1,848,851
Bars—CF	1,791,499	346,280	56,596	2,194,375
Tool Steel	16,846	99,306	.....	116,152
Standard Pipe	2,801,135	670	15	2,801,820
Oil Country Goods	1,774,090	245,255	.....	2,019,345
Line Pipe	3,506,911	407	.....	3,507,318
Mech. Tubing	802,979	281,013	5,488	1,089,480
Pressure Tubing	374,646	49,998	16,031	440,675
Wire—drawn	2,744,482	51,247	31,015	2,826,744
Nails—Staples	528,924	.....	11	528,935
Wire—barbed	163,800	.....	1	163,801
Woven fence	245,264	.....	.....	245,264
Bale ties	37,945	.....	.....	37,945
Black plate	748,889	.....	.....	748,889
Tin & terne plate, hot dipped	1,318,080	.....	.....	1,318,080
Tin plate, electrolytic	3,343,458	.....	.....	3,343,458
Sheets—HR	7,379,305	347,002	16,302	7,742,609
Sheets—CR	11,030,583	122,707	121,079	11,274,369
Sheets—Gal.	2,290,664	204	.....	2,290,868
Sheets—Other coated	253,946	.....	.....	253,946
Sheets—enameling	228,938	.....	.....	228,938
Electrical sheets & strip	133,225	686,871	.....	820,096
Strip—HR	2,172,327	45,207	3,928	2,221,462
Strip—CR	1,917,407	20,955	227,749	2,166,111
Totals	73,732,389	5,817,796	601,708	80,151,893

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Steelmaking is a fine art in the Jessop mill. For example, the high alloy steel which went into the tool bits pictured above was produced in a small batch with the greatest of care. Each ingredient was weighed out meticulously. The formula was exactly prescribed according to the specific function of the end product and the melting took place under precise time and temperature control. Extreme quality control is more than a matter of pride-of-accomplishment with Jessop men. They want more customers and they want them to be satisfied. They want Jessop to be known as the absolute leader in the making of special steels. They work hard at it, every day.

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. production will hit bottom is a
er for speculation. It will de-
largely on how fast new busi-
picks up. The fact it is rising
tle encourages the belief perhaps
time isn't too far off when the
uction lag will be checked. A
ulating feature is the increasing
ber of rush jobs. These are
n to indicate that some consum-
have worked their stocks down
low point.

oungstown — District steel ingot
last week dropped 4 points to
per cent of capacity. Two bes-
er plants, 47 open hearths, and
last furnaces were engaged. U. S.
l Corp. curtailed operations due
ack of orders. It blew out its No.
last furnace, and reduced bes-
er operations to 6 turns weekly.
lso took off 1 open hearth.

hicago—Steelmakers here are dis-
ed to clean up their inventories of
ifinished, from ingots on down.
s has a softening effect on the
lmaking rate.

ates . . .

Plate Prices, Page 178

hiladelphia — Some improvement
noted in plates for pressure ves-
, but business generally is slug-
n. Only one district mill is op-
ting at anything like normal ca-
ity. Early deliveries are readily
ilable. March rollings will likely
heavier than in February due
gely to the fact March has more
rking days.

Pittsburgh—Competition is sharper
hough plate production leads other
el products in per cent of capacity
gaged. March ordering is slow from
pbuilders and freight car builders.
me of the slack is taken up by
sk sales for barges and tanks.

Boston—Except where plate fabri-
tors have tank or other specific
ntract backlogs, forward orders are
arce with carbon plate deliveries
o to three weeks. Second quar-
r bookings are slow. Most head
d flanged-work shipments are in
e with plate.

With eastern mills now all 4.10c,
ttsburgh district producers are
nfronted with $4.00 to $4.50 freight
sadvantage, but are not equalizing
a delivered basis.

Shops fabricating plates are carry-
g much smaller inventories.

Outlook for shipbuilding and paper
ill equipment is better, but plate
equirements will be spread over the
ture without influence on nearby
chedules.

New York—Plate business may be
shade improved. Tank and struc-
ural fabricators are showing a lit-

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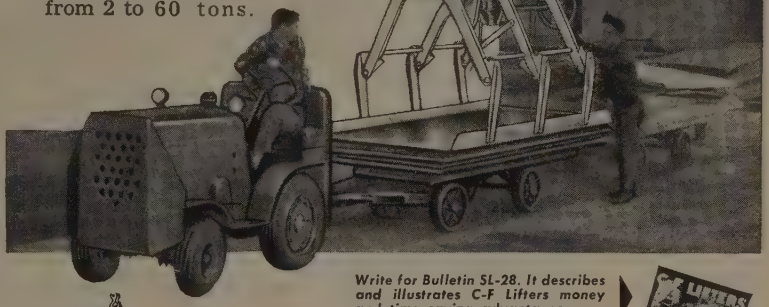
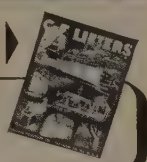
SAVE TIME... LABOR... MATERIAL...

C-F Lifters give you the fastest, cheapest and safest way to handle loose or bundled sheet steel or plate. 1 man operation saves labor; infinite adjustments of Lifter jaws permit it to handle many widths of steel . . . wide carrying angles hold packs securely, won't damage even highest grade sheets. C-F Lifters are made in standard and semi-special models with capacities from 2 to 60 tons.



Write for Bulletin SL-28. It describes and illustrates C-F Lifters money and time saving advantages.



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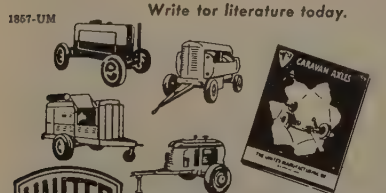

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MFG. COMPANY
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tle more interest, but there appears to be little change in the requirements of builders of machinery and allied products; and as to ship work and railroad equipment, needs are less active than at any time this year.

Operations in most eastern mills are lagging badly. Practically all can work in tonnage for this month. In some instances shipments can be made within a week to 10 days.

Sellers, inclined to be optimistic, are looking forward to April to bring something in the way of more appreciable gain in business.

Wire . . .

Wire Prices, Page 180

Boston—Wire orders, up slightly, are more diversified. Forward buying is nil. Almost 90 per cent of bookings last month were for March or late February shipment. This buying policy continues. Increase in prompt shipment orders indicates inventories are down to where more replacement is warranted. There are wide openings in mill schedules for April. Finishing operations are well under capacity on all products this month. April schedules are likely to be slightly better.

Pittsburgh—Sales gains in merchant wire are largely seasonal. Orders are increasing for lawn fence, but activity is dull in production of barbed wire, farm fence and nails. Manufacturers wire sales increased early in February but are gradually slipping.

Stainless Steel . . .

Stainless Steel Prices, Page 182

New York—Annual production of stainless steel ingots exceeded 1 million tons in 1953 for the first time in history, reports the American Iron & Steel Institute. Preliminary data indicate output during the year was 1,015,303 net tons, topping the previous record of 933,730 tons established in 1951. During 1952, output was 930,164 tons, having been curtailed by the long steel strike that year.

Since the first postwar year, 1946, stainless production has increased 84 per cent. Meanwhile, total steel output has increased 67 per cent. Compared with 1937, stainless output has increased about 6½ times while total steel production has approximately doubled.

As with total steel products, the greatest tonnage among manufacturing users last year went to the automobile industry. Other leading users were in household goods, industrial equipment and aircraft. Construction and military uses also took substantial quantities, and there were many other uses, such as restaurant kitchens, railroad cars, hospital equipment, radio and electronic devices.

Tubular Goods . . .

Tubular Goods Prices, Page 181

Denver—Colorado-Western Pipeline Co. plans a $21,600,000, 328-mile pipeline from the Ignacio natural gas field in southwest Colorado to Denver. The line would be 18-inch pipe the first 200 miles and 16-inch the last 108 miles.

Boston—Merchant steel pipe buying is dull with distributors carrying substantial inventories. Several producers have reduced buttweld production and are offering for prompt shipment a wider range of sizes from stock. Seamless sales with distributors are lower.

Philadelphia—Merchant pipe producers are receiving orders from some distributors for the first time in weeks. Consumption of buttweld and lapweld pipe, however, is light and jobbers continue to make price concessions.

Pittsburgh—Three new mills in the U. S. are starting production of oil country tubular products in first half of this year. Predictions that fewer wells will be drilled this year than last indicate growing competition for sales in third quarter. Order books are full into second quarter. Seamless tubular specialties remain slow. No pickup is yet in sight for buttweld.

Seattle—A new angle was injected recently into the cast iron pipe market when British sellers asked for details of a bid call at Bellingham, Wash., Mar. 8, involving 3600 feet of 20 inch cast iron to replace wood mains.

Tin Plate . . .

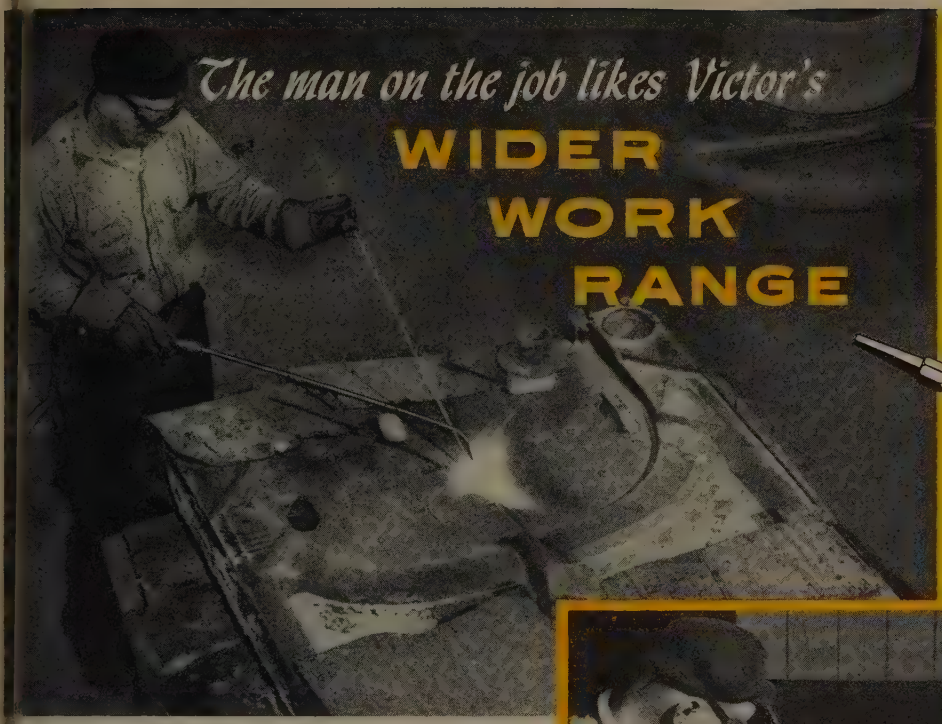
Tin Plate Prices, Page 180

Washington—Shipments of metal cans last year totaled 4,082,254 short tons of steel, increase of 240,084 tons over 1952, reports the Census Bureau. The margin of gain would have been larger had it not been for strikes at plants of two leading canmakers. Effect of these is reflected in December shipments of 192,403 tons, compared with 314,408 tons in November.

Food can shipments totaled 2,614,764 tons against 2,554,874 in 1952. Fruit and vegetables (including juice) accounted for the major portion—1,386,095 tons, against 1,340,177. Non-food cans took 1,467,490 tons, compared with 1,287,296 the

(*Please Turn to Page* 203)

The man on the job likes Victor's WIDER WORK RANGE



ing a VICTOR No. 310 torch butt with two extensions and No. 8 type 4 tip, Joe Wyman nreve Welding Co., Oakland, Calif.) repairs t iron heating boiler header with VICTOR No. ow fuming manganese bronze rod. Inset photo ows 5/64" build-up on undersize castings, done h same No. 310 torch but with No. 5 type 4 zzle and VICTOR No. 6 square cast iron rod.

CTOR'S wider work range pays off from the y you select your first VICTOR welding outfit through a lifetime of reliable service. You buy e torch you need for your present work, add ex- nsions, cutting attachments or special nozzles as ey're needed. Result: top-quality equipment at's always perfectly matched to your needs!

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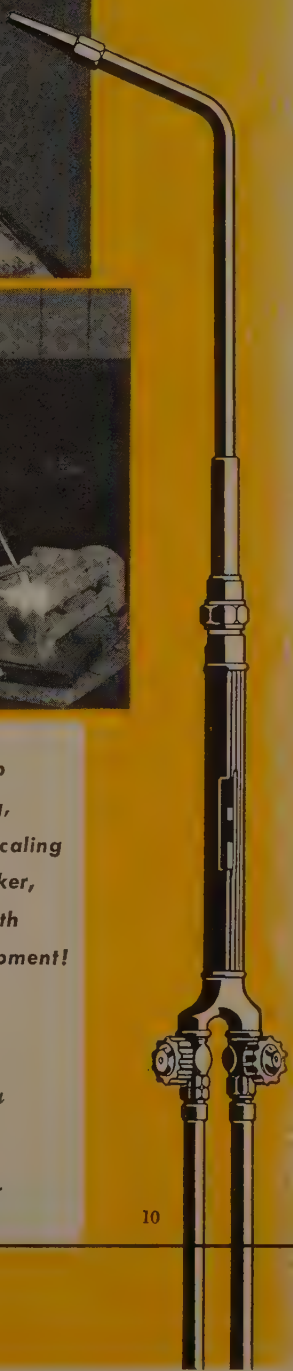

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10

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max, 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min. carloads, 30c; 2000 lb to min. carloads, 32c; 250 lb to 1999 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 1.5c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-86%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon: No. 2: (Cr, 36-39%, Si 26-39%, Al 7-9%, C 0.05% max). 25.75c per lb of contained chrome plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, corload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet. Packed c.l. 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c. Packed c.l. 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more, $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max. C 0.4% max.). Contract, ton lot, 2" x D, $6.40 per lb of contained Cb, less ton $6.45. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-075%), Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

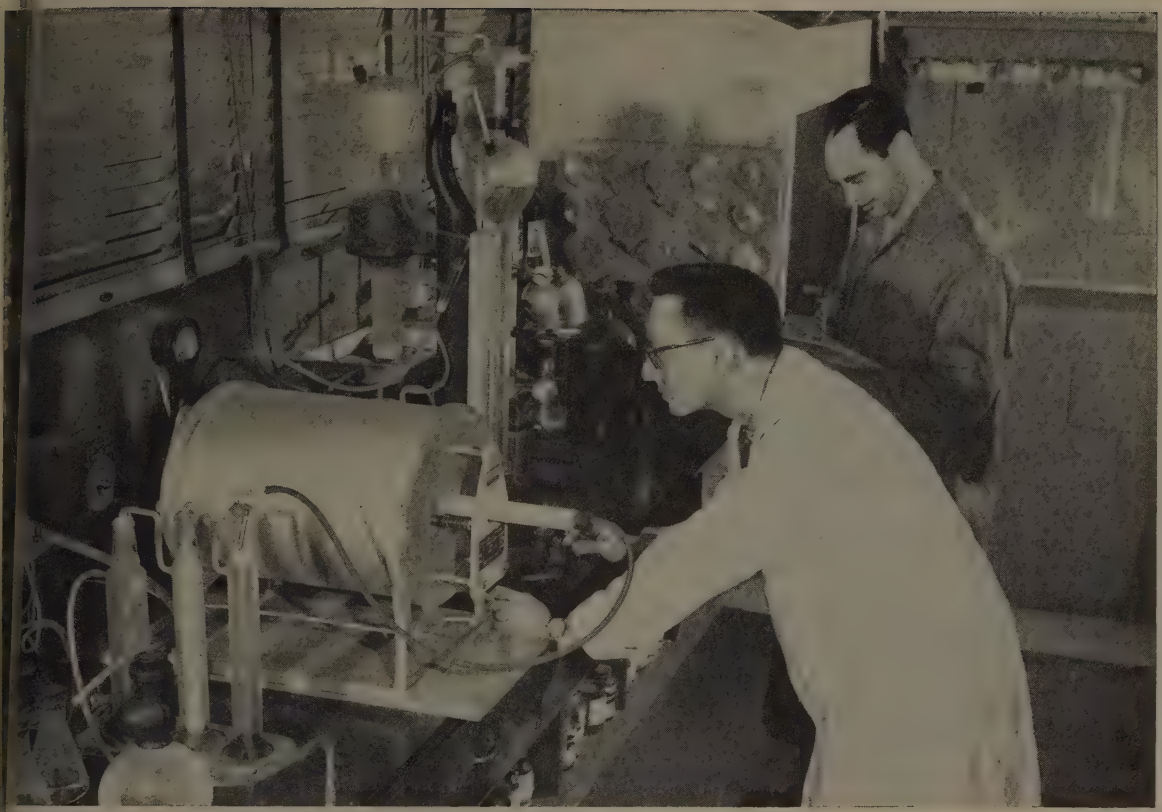
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c. Packed c.l. 15.50c, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.



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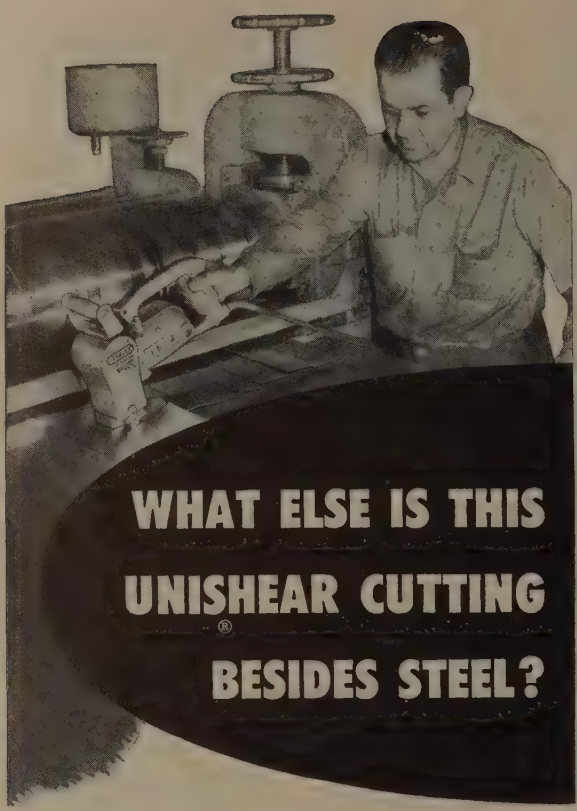

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This "extra cutting power" of the Stanley UNISHEAR was acquired by Dolan Steel Co., Bridgeport, Conn., when they switched from hand-snip operation to UNISHEARS. Says Mr. James A. Dolan, Jr., of Dolan Steel Co.: "We use the Stanley UNISHEAR to cut the leading edge of the roll, to trim out imperfects, and to cut after slitting. We have come to regard the UNISHEAR as invaluable. It is a tremendous improvement over the hand-snip method. Not only does the UNISHEAR do a smoother, cleaner job, it saves our men a lot of fatigue and effects a time-saving in operations."

Thank you, Mr. Dolan! Dolan Steel Co. uses the UNISHEAR model shown here. But you have your choice of six different portable models and two stationary. Also cutting attachments and accessories. A directory of Stanley Service Stations (there's one near you) is packed with every tool.

No. U-212

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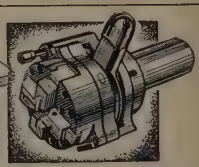

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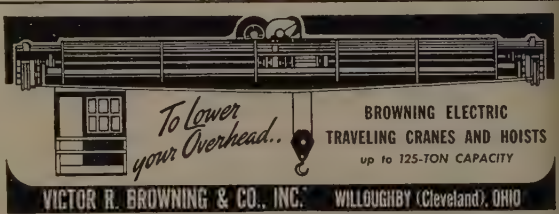

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By Albert Portevin

Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

246 pages — 4 tables
69 illustrations — Price $5.00 Postpaid

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ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, upper lake ports.)

Bessemer range bessemer	$10.30
Bessemer range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	22.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite min. 60%, WO_3	23.80
Domestic scheelite, mine	63.00

Manganese Ore

Chin, 48% nearby, $1.12 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05-$1.07.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.:

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$24.00-$26.00
48% no ratio	34.00

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mb content mines, unpacked $1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.00
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Buffalo, deld.	28.08
Flint, deld.	28.23
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$44-47
Birmingham area	$45.00†

† With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

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Inches Diam.	Length	Per 100 lb
GRAPHITE		
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00
CARBON		
40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

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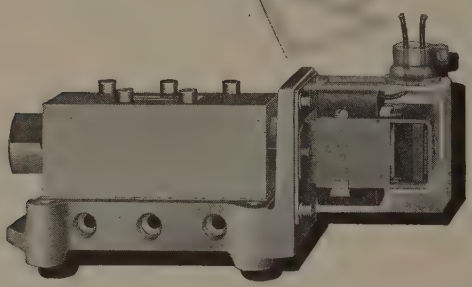

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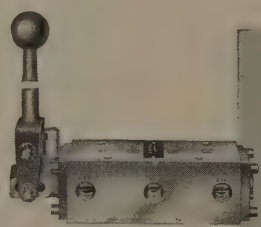

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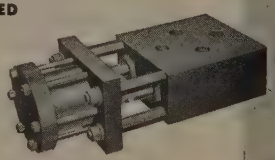
Two position valves, ½" to 4" sizes, for line pressures from 1000 to 5000 psi. Valve is placed close to the work and operated from a central control point with an easy to handle air valve avoiding operator fatigue.



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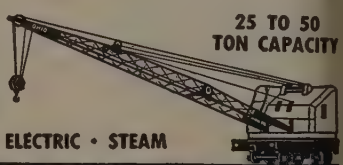

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T Plate . . .

(*Concluded from Page* 196)

y before. Biggest gain in this gory was in beer cans, shipments unting for 615,702 tons against)76.

ıicago—Demand for tin plate here suffer if predictions of reduced ing are borne out. In Wisconsin, said, acreage for peas and corn ably will be cut. Both are in long oly, and the market has been be- costs. Some canneries may not n.

steners . . .

Bolt, Nut, Rivet Prices, Page 181

ittsburgh—F. R. Dickenson, presi- t, Townsend Co., reports an order kup indicates inventory adjust- its are being completed by custo- rs. At Townsend, sales of about million are anticipated in first f. Net sales were $7.8 million in half of 1953.

g Iron . . .

Pig Iron Prices, Page 182

New York—Blast furnace produc- n of pig iron and ferroalloys in nuary totaled 5,579,513 net tons, orts the American Iron & Steel titute. Of this, 5,515,689 tons re pig iron and 63,824 ferroalloys. rnace operations averaged 80.1 per rt.

In December, output amounted to 78,840 tons, of which 5,712,938 re pig iron and 65,902 ferroalloys. erations were 85.9 per cent. In nuary, 1953, output was reported at 64,383 net tons, divided 6,482,081 ns pig iron, and 82,302 ferroalloys. rnaces operated at 97.3 per cent capacity.

Production by districts in January, 54, follows:

BLAST FURNACE PRODUCTION
JANUARY 1954
(Net Tons)

strict	Pig Iron	Ferroalloys
stern	1,214,838	16,972
tsburgh-Youngstown	1,876,450	19,249
veland-Detroit ...	587,926	.....
icago	1,151,180	15,448
uthern	466,108	12,155
estern	239,187	.....
Totals	5,515,689	63,824

New York—Pig iron business is ght. March volume will likely show ttle variation from last month. oundry operations remain spotty.

Boston — Demand for pig iron is ow, both foundry and basic grades. dditional foreign iron is offered and me basic has been purchased. De- ite the low cost of scrap in rela- on to iron few shops have increased he ratio of scrap to iron in their lelts. With operations off and competition for casting orders sharp, most foundrymen are unwilling to take chances on rejections.

Philadelphia—Pig iron sellers don't expect any appreciable pickup in demand this month. Except for pressure pipemakers, gray iron foundries are operating at a slow pace. Steel foundries are not doing too well. Furnaces are piling iron.

Cleveland — With foundry operations continuing spotty, demand for merchant iron is lagging. Sellers are anticipating some improvement in volume during second quarter but indications are consumers will largely buy for needs in sight. With tonnage available for prompt shipment they are disinclined to stockpile to any large extent.

Interlake Iron Corp., merchant iron producer, expects its 1954 sales volume to fall under that of last year when it shipped 1,166,843 gross tons, about 6 per cent more than in 1952.

Production of pig iron in the Cleveland-Detroit district, as reported by the American Iron & Steel Institute, in January was 587,926 net tons, with district blast furnace operations averaging 79.4 per cent of capacity. In December, district output totaled 584,664 tons with operations 79.9 per cent, while in January, 1953, output amounted to 723,872 tons, and operations averaged 98.7 per cent.

Cincinnati—A pickup in demand for pig iron in the South has not made itself felt here. Greatest deterrent to better foundry business has been lagging automotive production. Agricultural machinery work has improved.

Chicago—Cautious buying is the policy of pig iron consumers. Inventories haven't been fully liquidated. Until there is a significant upturn in casting demand shipment releases will be restricted. Keeping pig iron demand soft, too, is the fact cast scrap is selling for around $20 less than iron, and it is plentiful.

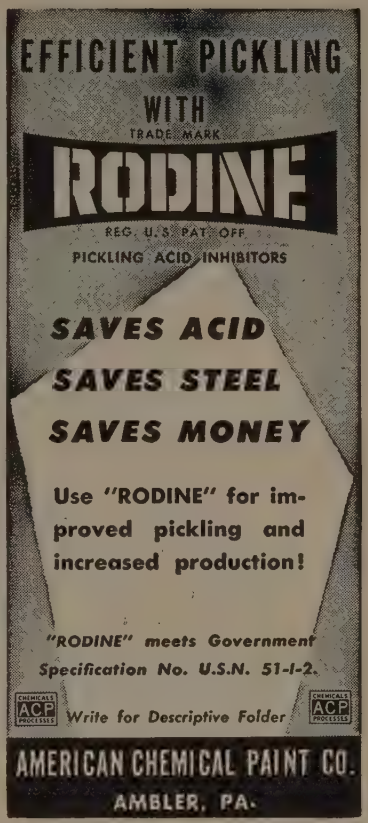
St. Louis—Pig iron market is quiet. Although one of the two blast furnaces here is shut down for relining, current output plus ground stocks is able to meet demand.

Reinforcing Bars . . .

Reinforcing Bar prices, Page 178

Los Angeles—Fabricators are optimistic over market prospects. Construction activity is spotty but much work is on drawing boards.

Seattle—New reinforcing bar business consists of small tonnages. No major projects involving reinforcing are pending. Mill operations are unchanged.



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New York City:
Ritz Tower
Resorts:
Whitehall, Palm Beach, Fla.
Samoset, Rockland, Me.

Scrap . . .

Scrap Prices, Page 206

Cleveland — Steelmaking scrap prices are off another $1 per ton to a range of $20 to $21, delivered consumer plant, on No. 1 heavy melting steel, but in the absence of sales quotations are largely nominal. Further decline in the market is anticipated with steelmaking operations here and in the Valley declining. The Cleveland ingot rate last week was off 8 points to 66 per cent of capacity, while the Valley rate was off 4 points to 70 per cent.

Feeling in scrap circles is that the market is nearing bottom, but some sellers anticipate $20, Valley, on No. 1 heavy melting before the trend is reversed. This would mean around $17, Cleveland. Several railroad lists are closing over the next week and indications are they will bring lower prices than have prevailed of late.

Boston—Lack of demand and low prices have all but halted steel scrap collections and yard operations. Yard stocks are heavy. Cast prices are somewhat more stabilized with small lot shipments slightly heavier.

Buffalo—Scrap consumers continue to hold to the sidelines. Slump in steel production is the leading market factor.

Philadelphia — Trading in steel scrap remains sluggish with major open-hearth grades off another $1 per ton. No. 1 heavy melting and No. 1 bundles are down to $23, delivered consuming plant, on light trading. No. 1 busheling is quoted on the same level on a nominal basis. No. 2 heavy melting declined to $20 a ton, delivered, and No. 2 bundles to $18 on buying by one consumer. Short shovel turnings are off $1 to $17 to $18, delivered. Prices on other grades are unchanged.

Pittsburgh — Market continues sluggish with small purchases of blast furnace scrap reported at $1 or $2 per ton below the preceding week's quotations. Prices for most grades are nominal. Cast iron grades remain level.

Cincinnati—Prices are lower here, reductions ranging from $1 to $2.50 a ton. Nominal quotations on mixed borings and turnings, short shovel turnings and cast iron borings are $2.50 lower. A drop of $2 a ton was recorded in machine shop turnings, low phosphorus, No. 1 cupola, charging box cast, and drop broken machinery. The following were quoted $1 lower: No. 2 heavy melting; No. 2 bundles, malleable and rails, 18 i and under.

Detroit—Scrap prices continue decline with dealers' inventories ri ing and steel operations slippin Foundry purchasing continues sustain prices on the cast grades b open-hearth material is slack.

Chicago—Limited sales of turnin and cast iron scrap have advanc prices for these items around $1 p ton. Steelmaking grades rema pegged at previous levels. For t most part material of dealer orig is unwanted and prices are nomin Good steel inventories of scrap a a somewhat lower steelmaking ra make for a featureless market.

St. Louis—Scrap prices contin to soften with railroad heavy mel ing steel the principal exception. F other items, orders are spotty a prices subject to haggling.

Los Angeles—With most steel pr ducers out of the market, scr movement has slowed to a trickl The market for steelmaking grad is weak. Prices are unchanged b offerings at $2 to $4 less than post levels find no takers.

San Francisco—Steel scrap pric are unchanged. The last few wee there virtually has been no buyin

Seattle—The scrap market co

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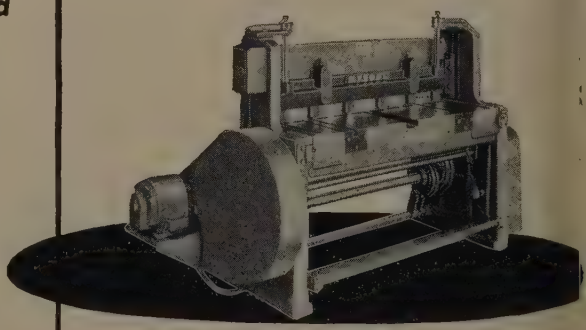

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tes to drag. Larger buyers have stantial inventories. Only a ted export business has been done this area.

oronto, Ont.—Canadian scrap iron steel prices again were slashed to $3 per ton, with demand virtually at a standstill. Steel mills in Hamilton district are either out the market or taking only token oments and report inventories at k levels. Latest reductions bring el scrap prices $8 to $9 per ton ow those prevailing at close of 3.

RUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

) tons, assembly building, Sikorsky Divion, United Aircraft Corp., Stratford, Conn., Harris Structural Steel Co., New York.

tons, recreation center building, Bangor, e., to Bethlehem Steel Co., Bethlehem, a.; Volpe Construction Co., general conactor.

tons, municipal marine transfer station, Vest 135th St. and the Hudson river, New ork city, through J. Rich Steers Co., to Harris Structural Steel Co., that city.

tons, construction, Sun Oil Co., Philadelnia, to Belmont Iron Works, Eddystone, a.

tons, plant addition, Hercules Powder Co., urlington, N. J., to Belmont Iron Works, ddystone, Pa.

tons, Welsh grape juice plants at Kennewick and Grandview, Wash., to Isaacson ron Works, Seattle, and an unstated Portland, Oreg., fabricator; Hall-Atwater Co., eattle, and W. H. Bartram, Grandview, eneral contractors.

tons, elementary school, Chicopee Falls, lass., to Topper & Griggs, Hartford, Conn., hrough Fontaine Bros., Chicopee Falls, genral contractor.

tons, Seattle Light Department, to Isaacon Iron Works, Seattle, low $14,147.

tons, steel decking, safety beam stock, for eattle, to Reliance Steel Products Co., eattle, low $13,795.

tons, plus, two bridge cranes and lifting eam, The Dalles dam, to Moffett Engineering Co., Albany, Calif., low $517,720, to J. S. Engineer, Portland, Oreg.

tons, gantry crane for The Dalles dam, to Pacific Coast Engineering Co., Alameda, Calif., low $338,500, to U. S. Engineer, Portland, Oreg.

stated, Moose river bridge, Alaska, to Badraun & Flecksing, Seattle, low $57,083, o Alaska Road Commission; steel furnished y the government.

STRUCTURAL STEEL PENDING

0 tons, bridge superstructure, Ohio river, ear Shawneetown, Ill., Allied Structural teel Co., Chicago, low.

0 tons, warehouses, airfield base, Portsnouth, N. H.

) tons, control tower and building, Logan nternational Airport, Boston.

) tons, four state bridges, Southeast expressway, Section 3, Milton, Mass.; Maranucci Bros. Construction Co., low, general contract.

) tons, addition to Washington Athletic Club, Seattle; bids Mar. 16.

) tons or more, factory and warehouse, Johns-Manville Corp., Waukegan, Ill., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

) tons, Central joint high school, Dauphin County, Pennsylvania, bids closed Mar. 4.

5 tons, William Penn junior high school, Fairless Hills, Pa., Edwin E. Hollenbach, Philadelphia, low on general contract.

7 tons, black steel for lighting department; bids to Seattle Mar. 11.

EINFORCING BARS . . .

REINFORCING BARS PLACED

5 tons, substructure, state highway bridge, Deerfield river, Buckland-Charlemont, Mass., to Truscon Steel Division, Republic Steel Corp., Boston.

143 tons, Helena, Mont., high school, to Bethlehem Pacific Coast Steel Corp., Seattle.

112 tons, Seattle district shops, State Highway Department, to Soule Steel Co.

100 tons, substation steel, Screw Mfg. Co., Portland, Oreg., low $24,590 f.o.b. destination, to Bonneville Power Administration.

100 tons, including 60 tons for Deschutes fishery, to J. D. English Steel Co., Tacoma, Wash.

100 tons or more, bars and structurals, office building, Fram Corp., East Providence, R. I., to Plantations Steel Co. (bars) and Rumford Steel Products Inc., Providence (structurals); Gilbane Building Co., Providence, general contractor.

Unstated, hangar, warehouse and other facilities, National Guard airport, Anchorage, Alaska; S. Macri & Co., Seattle, low $717,764 to U. S. Engineer.

Unstated, service equipment, administration buildings, railroad track, tanks, facilities, etc., aircraft nuclear propulsion project, $2.5 million, Idaho state; bids to Atomic Energy Commission, Idaho Falls, Idaho, Mar. 31.

REINFORCING BARS PENDING

315 tons, state highway bridges, Fall River expressway, Brockton, Mass., bids Mar. 9, Boston.

100 tons, including T-beam undercrossing at Spokane, Wash.; bids to Washington Highway Department, Olympia, Wash., Mar. 16.

Unstated, retaining wall and tank foundations for Port of Seattle's expanded tank farm, East Waterway dock; bids Mar. 8.

Unstated, 330-ft Idaho state highway bridge, Boise river; bids to Boise, Idaho, Mar. 2.

Unstated, four Idaho state highway bridges; general contract to Neilson & Smith, Twin Falls, Idaho, $498,510.

Unstated, Ballard shopping center, Seattle; Jentoft & Forbes, Seattle, low $613,311.

Unstated, 11 ammunition storage igloos, Camp Hanford; bids to U. S. Engineer, Walla Walla, Wash., Apr. 1.

PLATES . . .

PLATES PLACED

115 tons, 200,000-gal. elevated water tank, Pilot Mountain, N. C., to Chicago Bridge & Iron Co., Chicago.

100 tons, hoppers for Kaiser gypsum plant, Seattle, to Puget Sound Sheet Metal Works, Seattle.

PLATES PENDING

1275 tons, structural plate, Air Force depot, Topeka, Kans.; bids Mar. 15, contracting office.

350 tons, 1-million-gal. elevated water storage tank, Ft. Hood, Tex.; bids in to U. S. Engineer, Ft. Worth, Tex.

200 tons, 500,000-gal elevated water tank, Camp Detrick, Md.; bids to Corps of Engineers, Washington.

100 tons, elevated water storage tank, veterans' hospital, Columbia, S. C., Pittsburgh-Des Moines Steel Co., Pittsburgh, low.

Unstated, 870,000-gal. storage tank; bids to Portland, Oreg., Mar. 11.

Unstated, ½-million-gal. storage tank; bids to District No. 68, Bellevue, Wash., Mar. 8.

Unstated, 150,000-gal. steel tank, Dalton Gardens project; bids to Bureau of Reclamation, Coeur d'Alene, Idaho, Mar. 23.

PIPE . . .

CAST IRON PIPE PENDING

350 tons, additions to city system; bids in to Marysville, Wash., Mar. 1.

STEEL PIPE PENDING

Unstated, 60,000 feet of 16 and 14-inch, Dalton Gardens project; bids to Bureau of Reclamation, Coeur d'Alene, Idaho, Mar. 23.

RAILS, CARS . . .

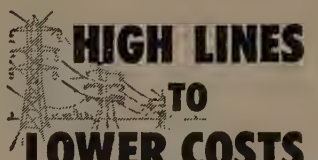
LOCOMOTIVES PLACED

Baldwin-Lima-Hamilton Corp., Eddystone, Pa., books order for ten 1200-hp diesel switchers.

RAILROAD CARS PLACED

Canadian Pacific, one diesel car, to Budd Co., Philadelphia.

City Transit Authority, New York city, 200 subway cars to American Car & Foundry Co., New York.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Mar. 4	$24.50
Feb. 25	25.50
Feb. Avg.	26.91
Mar. 1953	44.05
Mar. 1949	34.60

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*25.00-26.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*25.00-26.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	12.00-13.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals	*29.00-30.00*
Heavy turnings	*26.00-27.00*
Punchings & plate scrap	*27.00-28.00*
Electric furnace bundles	*28.00-29.00*

Cast Iron Grades

No. 1 cupola	34.00-35.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	24.00-25.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt	*27.00-28.00*
Rails, 2-ft. and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00
Railroad specialties	*34.00-35.00*

Stainless Steel Scrap

(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	85.00-87.00
430 turnings	60.00-62.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*20.00-21.00*
No. 2 heavy melting	*18.00-19.00*
No. 1 bundles	*20.00-21.00*
No. 2 bundles	*16.00-17.00*
No. 1 busheling	*20.00-21.00*
Machine shop turnings	8.00-9.00
Mixed borings, turnings	12.00-13.00
Short shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos.	*23.00-24.00*
Alloy free, short shovel turnings	*13.00-14.00*
Electric furnace bundles	*20.00-21.00*

Cast Iron Grades

No. 1 cupola	*37.00-38.00*
Charging box cast	26.00-27.00
Stove plate	33.00-34.00
Heavy breakable cast	22.00-23.00
Unstripped motor blocks	21.00-22.00
Brake shoes	30.00-31.00
Clean auto cast	38.00-39.00
No. 1 wheels	36.00-37.00
Burnt cast	27.50-28.50
Drop broken machinery	*38.00-39.00*

Railroad Scrap

No. 1 R.R. heavy melt	*25.00-26.00*
R.R. malleable	*38.00-39.00*
Rails, 3-ft. and under	*41.00-42.00*
Rails, 18 in. and under	*44.00-45.00*
Rails, random lengths	*37.00-38.00*
Cast steel	*32.00-33.00*
Railroad specialties	*32.00-33.00*
Uncut tires	*34.00-35.00*
Angles, splice bars	*38.00-39.00*
Rails, rerolling	*38.00-39.00*

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*23.00-24.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*23.00-24.00*
No. 2 bundles	20.00-21.00
Machine shop turnings	*10.00-11.00*
Short shovel turnings	*15.00-16.00*
Cast iron borings	*15.00-16.00*
Low phos.	25.00-26.00
Electric furnace bundles	24.00-25.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*23.00*
No. 2 heavy melting	*20.00*
No. 1 bundles	*23.00*
No. 2 bundles	*18.00*
No. 1 busheling	*23.00*
Electric furnace bundles	25.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	*17.00-18.00*
Structurals & plate	28.00
Heavy turnings	21.00
Couplers, springs, wheels	30.00
Rail crops 2 ft & under	40.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Malleable	38.00-39.00
Heavy breakable cast	36.50-37.50
Unstripped motor blocks	28.00
Drop broken machinery	40.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	16.00-17.00*
No. 2 heavy melting	13.00-14.00*
No. 1 bundles	16.00-17.00*
No. 2 bundles	11.00-12.00*
Machine shop turnings	4.00*
Mixed borings, short turnings	7.00-8.00*
Low phos. (structural & plate)	25.00-26.00*
Short shovel turnings	8.00-9.00*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	21.00-22.00

Stainless Steel

18-8 sheets, clips, solids	160.00-165.00
18-8 borings, turnings	80.00-85.00
430 sheets, clips, solids	50.00
410 sheets, clips, solids	40.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	14.00-15.00
No. 2 heavy melting	11.00-11.50
No. 1 bundles	13.00-13.50
No. 2 bundles	9.50-10.00
Machine shop turnings	3.00-3.50
Mixed borings, turnings	3.00-3.50
Short shovel turnings	5.50-6.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	36.00-37.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	22.00-23.00
No. 2 heavy melting	*18.00-19.00*
No. 1 bundles	22.00-23.00
No. 2 bundles	*16.00-17.00*
No. 1 busheling	22.00-23.00
Machine shop turnings	*7.00-8.00*
Mixed borings, turnings	*10.00-11.00*
Short shovel turnings	*10.00-11.00*
Cast iron borings	*10.00-11.00*
Low phos., 18-in.	*29.00-30.00*

Cast Iron Grades

No. 1 cupola	*35.00*
Heavy breakable cast	*30.00*
Charging box cast	*30.00*
Drop broken machinery	*40.00*

Railroad Scrap

No. 1 R.R., heavy melt.	26.00-27.00
Malleable	*32.00-33.00*
Rails, 18-in. and under	*42.00-43.00*
Rails, random lengths	35.00-36.00

CHICAGO

No. 1 heavy melting	24.00-26.00
No. 2 heavy melting	21.00-22.00
No. 1 factory bundles	26.00-27.00
No. 1 dealer bundles	23.00-24.00
No. 2 bundles	18.00-19.00
No. 1 busheling	*24.00-26.00*
Machine shop turnings	*9.00-11.00*
Mixed borings, turnings	*9.00-10.00*
Short shovel turnings	*11.00-13.00*
Cast iron borings	*11.00-12.00*
Cut structurals, 3-ft	29.00-30.00
Punching & plate scrap	29.00-30.00
Electric furnace bundles	28.00-29.00

Cast Iron Grades

No. 1 cupola	*30.00-31.00*
Stove plate	*27.00-28.00*
Unstripped motor blocks	19.00-20.00
Clean auto Cast	*34.00-35.00*
Drop broken machinery	*36.00-38.00*

Railroad Scrap

No. 1 R.R. heavy melt	28.00-29.00
R.R. malleable	37.00-38.00
Rails, 2-ft. and under	39.00-40.00
Rails, 18-in. and under	40.00-41.00
Angles, splice bars	*34.00-35.00*
Rails, rerolling	36.00-37.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	42.00
430 turnings	*22.00-25.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*16.00*
No. 2 heavy melting	*14.50*
No. 1 bundles	*17.00*
No. 2 bundles	*14.50*
No. 1 busheling	*17.00*
Machine shop turnings	*5.50*
Mixed borings, turnings	*5.50*
Short shovel turnings	*8.00*
Punchings & plate scrap	19.00

Cast Iron Grades

No. 1 cupola	35.00
Charging box cast	25.00
Stove plate	28.00
Heavy breakable	25.00
Unstripped motor blocks	18.00
Clean auto cast	40.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	24.50-25.50
No. 2 heavy melting	21.50-22.00
No. 1 bundles	24.50-25.50
No. 2 bundles	19.50-20.00
No. 1 busheling	24.50-25.50
Machine shop turnings	12.00-13.00
Mixed borings, turnings	14.00-14.50
Short shovel turnings	16.00-16.50
Cast iron borings	14.00-14.50
Low phos.	28.50-29.50

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	28.50-29.50
No. 1 machinery	33.50-34.50

Railroad Scrap

Rails, random lengths	31.50-32.50
Rails, 2-ft and under	36.50-37.50
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	19.00-20.00
No. 2 heavy melting	17.00-18.00
No. 1 bundles	19.00-20.00
No. 2 bundles	16.00-17.00
No. 1 busheling	19.00-20.00
Cast iron borings	14.00-15.00
Short shovel turnings	14.00-15.00
Machine shop turnings	12.00-13.00
Electric furnace bundles	nom.

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*40.00-41.50*
Charging box cast	*29.00-30.00*
Stove plate	*37.00-38.00*
Bar crops and plate	*28.00-29.00*
Structural, plate 2 ft	*28.00-29.00*
Heavy breakable cast	*29.00-30.00*
Unstripped motor blocks	*33.00-34.00*
No. 1 wheels	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	nom.
Rails, 18 in. and under	39.00-40.00
Rails, random lengths	33.00-34.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*200*
No. 2 heavy melting	*200*
No. 1 bundles	*200*
No. 2 bundles	*100*
Machine shop turnings	*90*
Short shovel turnings	*90*

Cast Iron Grades

No. 1 cupola	*300*
Charging box cast	*200*
Heavy breakable cast	*200*
Unstripped motor blocks	*200*
Brake shoes	300
Clean auto cast	300
Stove plate	200

Railroad Scrap

No. 1 R.R. heavy melt	*300*
Rails, 18-in. and under	*300*
Rails, random lengths	300
Rails, rerolling	*300*
Uncut tires	*300*
Angles, splice bars	300

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	200
No. 2 heavy melting	200
No. 1 bundles	200
No. 2 bundles	100
No. 3 bundles	100
Machine shop turnings	150
Mixed borings, turnings	150
Short shovel turnings	150
Electric furnace, No. 1	300

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	35.00-300
Heavy breakable cast	25.00-300
Unstripped motor blocks	200
No. 1 wheels	38.00-400
Stove plate (f.o.b. plant)	200

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-300

SAN FRANCISCO

No. 1 heavy melting	200
No. 2 heavy melting	100
No. 1 bundles	100
No. 2 bundles	100
No. 1 busheling	200
Machine shop turnings	0
Mixed borings, turnings	0
Short shovel turnings	0
Cast iron borings	0
Cut structurals	200
Heavy turnings	0
Punchings & plate scrap	200
Electric furnace bundles	100

Cast Iron Grades

No. 1 cupola	300
Charging box cast	300
Stove plate	300
Heavy breakable cast	300
Unstripped motor blocks	200
Brake shoes	300
Clean auto cast	300
No. 1 wheels	300
Burnt cast	200
Drop broken machinery	400

LOS ANGELES

No. 1 heavy melting	200
No. 2 heavy melting	100
No. 1 bundles	100
No. 2 bundles	100
Machine shop turnings	0

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	35.00-300

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	*$20*
No. 2 heavy melting	*20*
No. 1 bundles	*20*
No. 2 bundles	*10*
Mixed ssteel scrap	*10*
Mixed borings, turnings	*10*
Rails, remelting	*30*
Busheling, new factory:	
Prepared	*20*
Unprepared	*10*
Short steel turnings	*10*

Cast Iron Grades†

No. 1 machinery cast	40

†F.o.b., shipping point.

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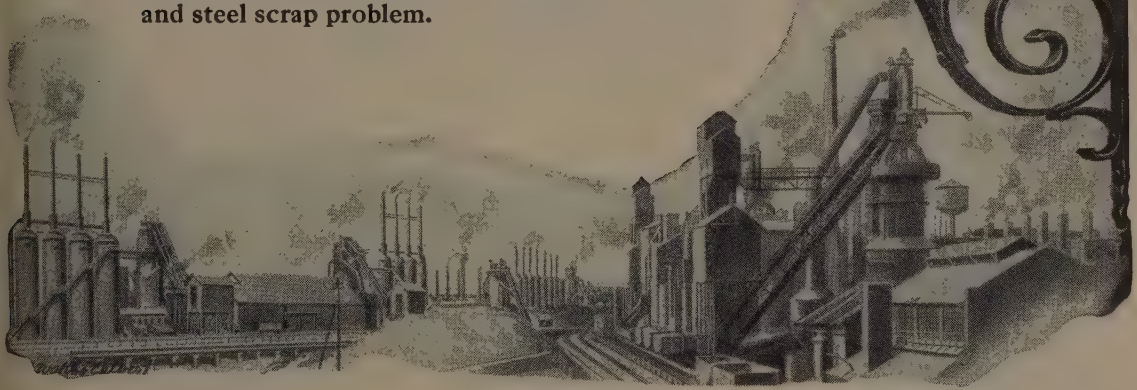

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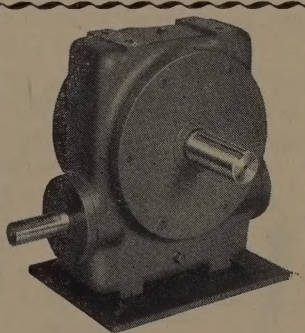

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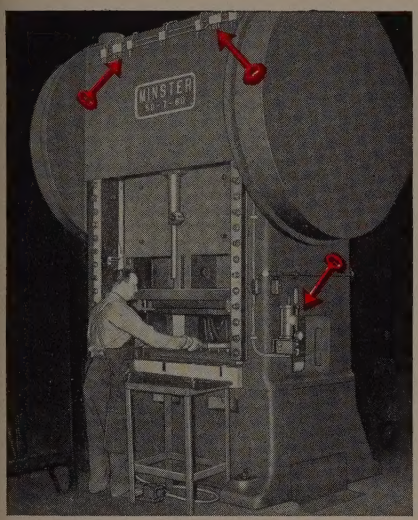
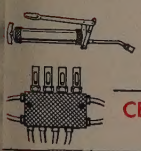
FARVAL SAVES DOLLARS

and many production hours on 4 Minster presses



KEYS TO ADEQUATE LUBRICATION—
Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know that a machine will be properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

FARVAL SAVES ON LUBRICATING 4 PRESSES
(Savings based on one work shift per day)



	Lbs./Yr. lube. 64 points	Hrs./Yr. lube. 64 points
GREASE GUN	576 lbs.	208 hrs.
CENTRALIZED SYSTEM	144 lbs.	52 hrs.
SAVINGS EFFECTED IN 3 YEARS BY FARVAL	1296 lbs.	468 hrs.

AND IN ADDITION, FARVAL SAVES BEARING EXPENSE AND PRODUCTION TIME

ports of lubrication engineers show lubrication by grease gun takes .747 nutes per point to clean dirt from nipples, grease, move from point to int and refill gun. With Farval it only takes .188 minutes per point to fill servoir, build up and hold pressure, and lubricate. In addition, Farval ves 3 pounds of each 4 of lubricant used by other methods.

THE press room is the bottleneck in any sheet metal plant. If presses are shut down for oiling or repair of bearings due to faulty lubrication, the entire manufacturing operation grinds to a halt. Production is lost.

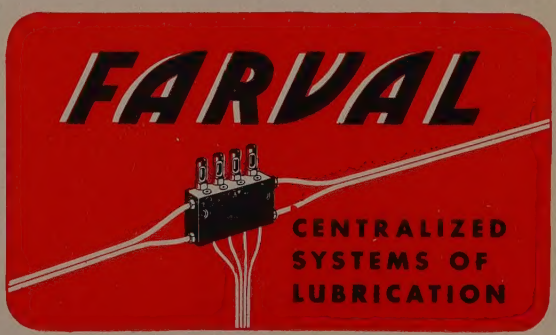
To avoid these troubles in its plant, Lyon Metal Products, Inc. installed Farval centralized systems of lubrication on their four Minster presses. The results were immediate: Farval resulted in considerable savings in labor and lubricant over a three-year period. But better than that, Farval freed these presses for their real work of high-speed, non-stop production by eliminating the "human element" involved in frequent shutdowns for lubrication. Now, with a quick stroke, all points (regardless of location) on a machine are lubricated properly, effortlessly. In addition, the Farval system is sealed against dust and scale which inevitably get into bearings with old-fashioned oiling methods.

Farval is the original Dualine system of centralized lubrication that delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, as often as desired. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble.

Today, Farval is working in hundreds of metalworking and processing shops protecting bearings on presses, coilers, shears—in fact, every type of equipment that must be lubricated regularly and properly.

If you want to lower production costs in your plant, you owe it to yourself to look into Farval. The savings will amaze you. Write today for free Bulletin 25. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

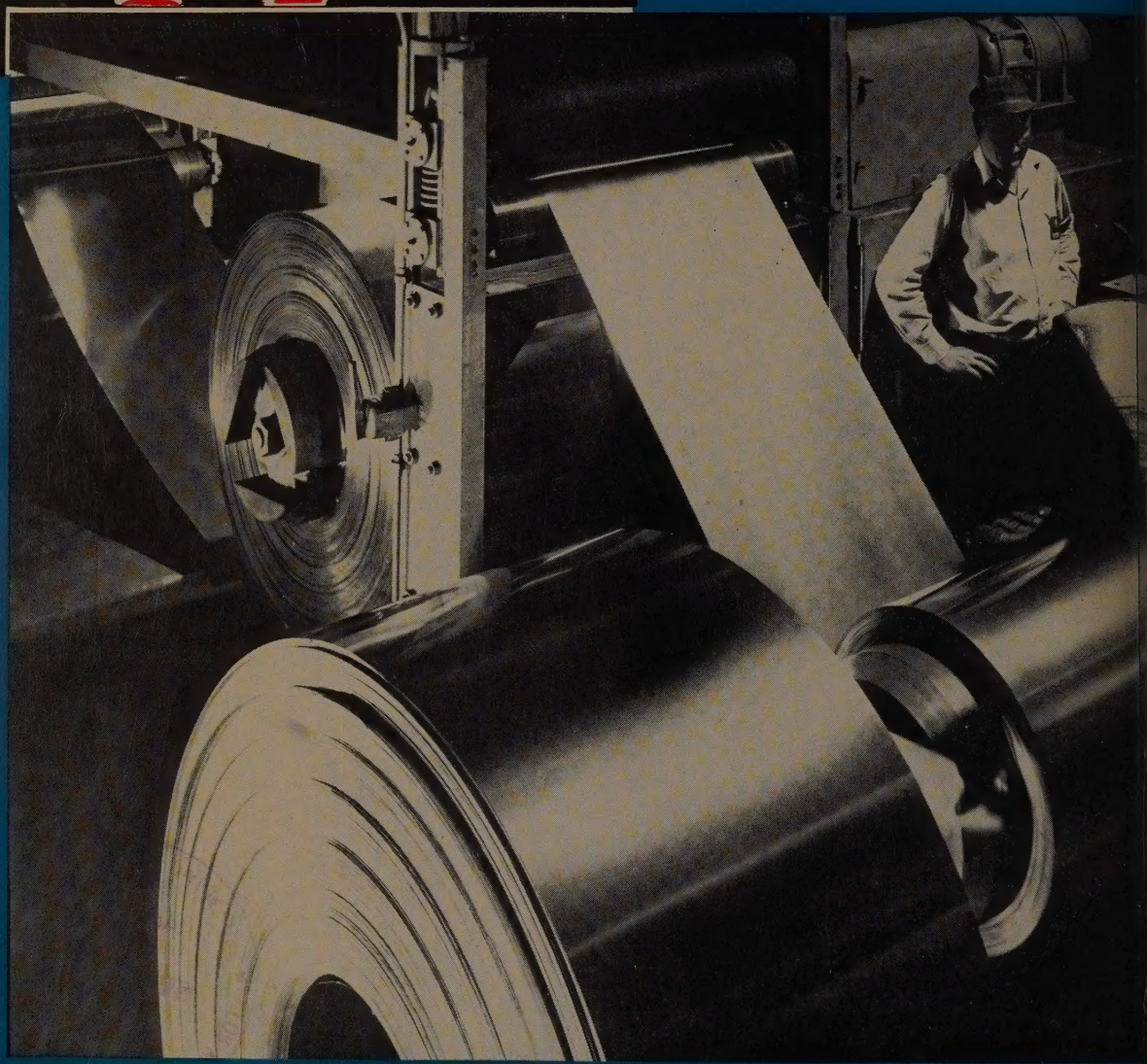
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



WEAN

ENGINEERING Company, Inc.

WARREN, OHIO



The Wean Engineering Company, Inc., Warren, Ohio is a recognized specialist in the design and installation of sheet, tin and strip mill equipment. The expert knowledge and trained imagination of one of the world's most noted steel mill engineering firms is at your service when you specify Wean—whether the job calls for a single piece of equipment or a complete design of an entire line.

SPECIALISTS IN SHEET, TIN and STRIP MILL EQUIPMEN